THE NEW WORLD SPECIES OF CYNOMETRA

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Cynometra, a Linnean genus of approximately 75 species is widely distributed throughout the tropics. The New World species have not been studied in detail since Bentham's limited treatment in Martius Flora Brasiliensis in 1876. The present study seems particularly timely in view of the current intensive studies on the African species.

History of the Genus

Linnaeus established the genus *Cynometra* in 1741 (Act. Soc. Upsal. 79) and included it in the first edition of *Species Plantarum* (p. 382. 1753), describing two species from India: *C. cauliflora* and *C. ramiflora.* Vogel described the first New World species: *C. americana* in 1836 (in Linnaea 10:602). In 1840 Bentham (Jour. Bot. 2:74) established the tribes Cynometreae and Amherstieae, including three species of *Cynometra* from tropical America: *C. bauhiniaefolia, C. marginata,* and *C. crassifolia*; his subsequent treatment of the genus in Martius Flora Brasiliensis (1876) is classical. The well-known *Cynometra spruceana* was described therein. Four years before Bentham's initial work, Tulasne described two species from French Guiana: *C. hostmanniana* and *C. parvifolia* (Arch. Mus. Nat. Paris 4:181. 1844). With the exception of *C. cubensis* described by de la Sagra (Hist. Cub. 10:233. 1845), all the remaining New World species appeared after 1895.

Recently Léonard (1951) presented an excellent history of the African species. In this same paper he made an important contribution to the taxonomy of the African cynometras when he distributed some 60 species, classically assigned to the genus, among 11 genera. Those species with the stipe of the pistil free in the receptacle-cup were placed in *Cynometra* in limited sense and in *Gilletiodendron.*

Intergeneric Reationship

To establish relationships between *Cynometra* and other genera is a challenging problem. If one considers the question on a regional basis, e.g. New World species only, and accepts the tribe Cynometreae as defined by Bentham as being clearly distinguishable from the allied tribe Amherstieae, the problem seems narrowed considerably. It has been traditional to follow this course in relating the New World cynometras. The Mexican, tropical American, and West Indian species have been related to the New World species of *Copaifera* and to the pantropical genus, *Crudia*; the leaves of these genera are multijugate and the flowers are apetalous, in contrast to *Cynometra* (New World) with unijugate leaves and 5 petals. While such characters are useful in distinguishing the genera, nevertheless, additional significant characters tend to make the problem of relationships of *Cynometra* on a world-wide scale a formidable task.

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Initially the validity of the tribe Cynometreae (as defined by Bentham) is jeopardized by the fact that the most fundamental character utilized by its author: the stipe of the pistil free in the receptacle cup, is not constant for all species of several genera included in the tribe: *Crudia*, *Cynometra* (in wide sense), *Schotia* etc.[1] Léonard, in his recent monograph (1951) of the African cynometras, recognized the inconsistency and divided some sixty African species previously accepted in *Cynometra* among 11 genera. Those species with the stipe of the pistil free in the receptacle-cup were placed in the emended genus *Cynometra* and in *Gilletiodendron* (5 species). In his later treatment (1957) of the African genera of the Cynometreae-Amherstieae complex, he studiously avoided stressing this same character in emending the two tribes under discussion. He elected as his principal distinguishing character the non-envelopment (Cynometreae) or envelopment (Amherstieae) of the floral buds by bracteoles. Unquestionably this was an excellent choice for the African genera; whether it can be applied with success to the non-African Old World genera is an interesting problem. Any discussion of this here would be out of place.

A noteworthy point in considering broad intergeneric relationships involving *Cynometra* is the lack of attention paid to the tropical American tribe Sclerolobieae (nine genera and approximately 60 species). In my opinion it is impossible to define the limits of the tribes Cynometreae and Amherstieae without giving careful consideration to this group.[2] Among its nine genera we find some genera with free central attachment of the stipe (*Sclerolobium*, *Diptychandra* etc.), some with eccentric attachment (*Dicymbe*); two have the bracteoles enveloping the floral buds (*Dicymbe* and *Thylacanthus*), while the remaining seven have bracteoles not enveloping the buds.

A third factor in establishing intergeneric relationships is the obvious relationship of *Cynometra* with the Papuasian genus *Maniltoa*. A superficial glance at herbarium material of *Maniltoa* (unfortunately poorly represented in herbaria) suggests their proximity. The foliage, young strobiliform racemes, and legumes are strikingly similar. The flowers of *Maniltoa* differ in several respects from those of *Cynometra* in the narrow sense: the receptacle-cup is usually more elongate, the stipe is often eccentric in position, and the stamens are numerous. The occasional fusion of the stipe to the wall of the hypanthium suggests affinity with one of the African segregates of *Cynometra*, the genus *Schotia*, also known in the Papuasian-Melanesian region. The need for a critical study of the relationships between *Cynometra* and *Maniltoa* is suggested by A. C. Smith in two recent papers (Sargentia 1:36–38. 1942; and Jour. Arnold Arb. 21:166–171. 1950.).

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[1] The stipe is constantly free in all New World cynometras, and likewise in all African species according to Léonard's concept. While the same is probably true for the Indian and Papuasian-Melanesian species, a thorough study of *Cynometra* and it ally *Maniltoa* in these areas is much needed.

[2] It is my opinion that the tribes Cynometreae, Sclerolobieae, and Amherstieae should be united to form one large tribe Amherstieae. This will be the subject of a separate paper.

In relating the New World cynometras therefore, we must seek affinities with genera traditionally placed in three tribes: Cynometreae, Amherstieae, and Sclerolobieae. The remarkable floral stability of the New World cynometras suggests that this group diverged from the main line evolving in Africa and were able to maintain themselves in a stable fashion in the New World. With the exception of the anomalous *C. fissicuspis* all the New World cynometras seem to resemble more closely (in a limited number of characters) Léonard's "groupe 2." Except for the fact that the extra-African Old World cynometras frequently have multijugate leaves, or occasionally simple leaves, the New World cynometras are structurally quite similar. Bentham in 1840 (in Hook. Lond. Jour. Bot. 100) remarked that "These American Cynometrae are similar to the Asiatic . . . decandrous ones, in the flower and inflorescence."

In viewing the problem of intergeneric relationships on a strictly regional basis, i.e. in the New World, *Cynometra* seems to be more closely related to the genus *Peltogyne* than to *Copaifera* and *Crudia.* The presence of petals, the subimbricate nature of the sepals, as well as the unijugate character of the leaves, suggest this. Their ranges are similar, extending from Mexico to south-eastern Brazil, although *Peltogyne* is absent from the West Indies. *Peltogyne* is readily distinguished from *Cynometra* by its pellucid-punctate leaflets, usually larger flowers, subclavate buds, glandular-punctate and usually densely pubescent sepals, more dilated stigmas, several to numerous ovules, paniculate inflorescences, and the often dehiscent legumes. That some of the species of *Peltogyne* have the stipe of the pistil eccentric is worthy of note.

MORPHOLOGICAL CHARACTERISTICS

STIPULES—these were not found on herbarium specimens, except a few of seedlings deposited in Utrecht. As Britton and Rose (1930) and Amshoff (1939) have indicated, the stipules are filiform and setaceous and measure up to 1 cm. in length.

LEAVES—the leaves of the New World cynometras are consistently unijugate, in this respect differing from several Old World species, e.g. *C. megalocephala* and *C. mannii.* Petioles are obvious in the New World species while petiolules are occasionally measurable, e.g. *C. hostmanniana, C. trinitensis,* and *C. crassifolia,* or are represented by a black glandular area at the base of the lamina. Occasionally a weak filiform extension terminates the petiole proper. While most cynometras have leaflets which are oblong or lanceolate, several divergent forms exist. Of the New World species *C. hostmanniana* alone has consistently equilateral laminas, while those of *C. marginata* var. *acuminata* are occasionally equilateral. Strongly inequilateral leaflets, on the other hand, characterize several species: *C. cubensis, C. oaxacana,* and *C. duckei.* In most species the blades are obviously acuminate, with a few: *C. spruceana* var. *phaselocarpa, C. microflora,* and *C. duckei,* with very obtuse leaflets. In two collections (*Purpus 7383,* the type of *C. oaxacana,* and *Spruce s. n.,* K. type of *C. spruceana* var. *procera*) the leaves were found to vary widely in texture and venation, some being thin and obviously reticulate, while others of the same collection were found to be thicker and smoother, with the principal veins immersed or evanescent. This is disconcerting inasmuch as considerable emphasis is placed on these characters in segregating the species.

The leaflets of the New World cynometras are not glandular-punctate although Pittier, the author of the confusing *C. fissicuspis*, assigns this character to the leaflets (cf. my discussion p. 342, this paper); Tulasne, too, in his original description of *C. parvifolia*, characterizes the blades as "interdum pellucido-punctatis." In the present study considerable attention was paid to the rugulose nature of the blade (under mag.) of some species as well as the papillate nature of the leaflets of other species. These are not completely reliable diagnostic characters at the species level inasmuch as the blades of some collections of *C. marginata* may be rugulose while others on the same twig are papillate. In general, however, those leaves with obviously reticulate leaflets are invariably papillate, and conversely those with immersed or plane secondary veins are rugulose. Among the New World cynometras only the new species, *C. duckei*, has the leaflets neither papillate nor rugulose above.

While petioles are invariably pubescent, the leaflets are rarely so (*C. bauhiniaefolia* var. *macrophylla*, some collections of *C. cubensis, C. crassifolia, C. longicuspis*). In most cases the hairs are confined to the mid-veins or may extend to the secondary veins, although the type of *C. bauhiniaefolia* var. *macrophylla* has completely pubescent blades.

INFLORESCENCES—two features of the inflorescence are useful for diagnostic purposes: the relative length of the rachis, and secondly the numbers of flowers present. Scarcely measurable rachises are occasionally densely flowered, e.g. *C. schottiana*. The usually elongate pedicels tend to persist on the rachis until the petals fall away. Initially the rachis emerges from a gemmiform cluster of concave and imbricate bracts, which are often persistent. Such collections of bracts, frequently described as strobiliform, are characteristic of other genera of the tribe Cynometreae: *Guibourtia, Copaifera*, etc. Unlike the bracteoles the bracts are stiffer, more crassate, and more uniformly pubescent (except in *C. hostmanniana*).

The bracteoles are oblong, carinate (doubtfully so in section NUMMUS), and paired, being attached at the base of the pedicels in most species. In three species: *C. spruceana, C. longifolia*, and *C. stenopetala* these appear to be located along the middle third of the pedicel. Bracteoles were not observed in *C. americana, C. cubensis, C. portoricensis, C. schottiana*, and *C. crassifolia*. Since bracteoles are soon deciduous it is possible that they may be present on immature inflorescences of these species.

The pedicels of the flowers are slender in all species, being better described as filiform in *C. spruceana, C. cuneata*, and *C. longiflora*. The reduction or absence of hairs on the floriferous pedicels of *C. hostmanniana* and *C. microflora* is noteworthy.

FLORAL STRUCTURE—the receptacle-cup or hypanthium, while small, is obvious as in most genera of the Amherstieae-Cynometreae complex, with the perianth and the androecium borne on the margin of same. The external pubescence of the hypanthium and the thickness of the wall are of little importance as interspecific characters in the New World cynometras.

The sepals are always somewhat unequal and reflexed at anthesis though not markedly so in *C. fissicuspis*. Although varying little in puberulence, venation etc., they are uniformly scarious in texture except in *C. americana*. These number 4 or 5, although reduction to three per flower is not uncommon. The flowers of *C. oaxacana* and *C. marginata* are occasionally bisepalous. The sepals are puberulent on the outside, often sparsely so; occasionally sepals of *C. oaxacana* and *C. spruceana* may be glabrous.

The petals of the New World cynometras show little variation in shape and venation, and are regularly thin except in *C. americana*. They are glabrous, except that those of *C. bauhiniaefolia* var. *macrophylla* and *C. parvifolia* may occasionally have a few apical or marginal hairs. In *C. portoricensis* and *C. stenopetala* the petals are of about the same length as the sepals.

The stamens are constantly 10 and glabrous. No staminodia were found in the numerous flowers dissected; the filaments are consistently slender, unequal in length, and united very briefly at the base. The anthers are always small, not exceeding 1.5 mm. in length, and versatile. In general the androecium furnishes no diagnostic characters of importance.

Equally disappointing in furnishing diagnostic characters is the pistil. In the key to species only three ovarian characters are utilized: the few hairs in *C. trinitensis*, the appressed sericeous condition of *C. cuneata*, and the glabrous condition of *C. fissicuspis*.

FRUITS—the fact that only about 10% of the herbarium material examined bore fruit presented considerable difficulty in interpreting the material. Despite this the legumes provide several important characters: size, thickness of the wall of the valves, and surface modification of the valves. Most ripe fruits are glabrous although the valves of *C. bauhiniaefolia* are velutinous while those of *C. spruceana*, and occasionally *C. portoricensis*, are puberulent. Whether this is a consistent character in the first two species is questionable. The pods are usually oblong, and turgid, and only occasionally are compressed, e.g. in *C. portoricensis* and *C. hondurensis*. They are regularly indehiscent. Amshoff states that *C. hostmanniana* has "infertile pods . . . at last splitting into 2, showing no cavity at all." A collection of *C. hostmanniana* (*Froes 25771*) has pods which seem to have split open irregularly on drying. This same irregular dehiscence was noted on a collection (*Elmer 12954*) of *C. bijuga* from the Philippine Islands.

The pericarp in dried fruit is usually very spongy in appearance on the broken surface and light in weight. The wall may range from 0.5 mm. (*C. parvifolia*) to 3 mm. (*C. retusa*) in thickness. This is probably an excellent diagnostic character, the limited fruiting material however, makes it difficult to evaluate. The pods are of 4 types with reference to the character of the surface: relatively smooth with minute granulations or excresences (*C. hemitomophylla*, *C. portoricensis*); obviously rugate and bearing some resemblance to the convolutions of a mammalian cerebrum (e.g. *C. bauhiniaefolia*); tuberculate (e.g. *C. duckei*); smooth, lustrous and vaguely reticulate (one species, *C. fissicuspis*). Rugate and tuberculate types are themselves often minutely granulose.

The fruits of *C. fissicuspis* are noteworthy inasmuch as they bear some resemblance to the pods of several African species placed by Léonard in his "Groupe 3." On the other hand these African species diverge markedly in having several pairs of leaflets, five sepals, bracteoles often articulate at the summit of the pedicels, and dehiscent fruits. The fruits of the taxa of "Groupe 3" are apparently more strongly reticulate and are not round but oblong in shape.

An examination of the legumes of the non-African Old World species indicates that they are regularly indehiscent and in general are either distinctly rugate or tuberculate, some being deeply incised on the surface.

Interspecific Relationships and Geographic Distribution

As suggested previously the New World cynometras are closely knit morphologically with surprisingly few characters of diagnostic importance. In view of the paucity of useful floral characters and the few legumes available for study, the foliage assumes added importance. Among the numerous species placed in section COMATOVARIA, those confined to Mexico and Central America tend to have considerably larger leaflets and to a lesser degree more compressed racemes than their South American allies. The fact that approximately one-half of the New World cynometras are found in Amazonia, with four species of the group: *C. longifolia*, *C. longicuspis*, *C. stenopetala* and *C. duckei*, restricted to the Brazilian states of Pará and Amazonas, suggests that Amazonian Brazil is the center of geographical distribution for the New World species.

Three new sections are proposed herein for the New World cynometras: COMATOVARIA, GUIANA and NUMMUS.[3] A view of Léonard's 3 "groupes", proposed for the African species of the genus, indicates that the 3 sections proposed for the New World species bear little relationship with those tentatively proposed for Africa.

Economic Importance

Although the cynometras are trees, the New World species are apparently of little use commercially. In discussing *C. sphaerocarpa*, Pittier, the author of the species (in *Enum. Plantas Usuales* 184. 1926) states that the wood is excellent for construction. In the same discussion he adds that the seeds "son estomáquicas y antipalúdicas." No oleoresins of commercial value have been reported for the New World cynometras.[4]

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[3] NUMMUS (L. = coin) refers to the fancied resemblance of the legumes of *C. fissicuspis* to a coin. COMATOVARIA (comatus L. = densely hairy) refers to the fact that the ovaries of all species are conspicuously hairy.

Standley in his *Flora of Lancetilla Valley* (Honduras), in Field Mus. Nat. Hist. 10:219. 1931, states that the wood of *C. retusa* is used for charcoal.

Record and Hess (*Timbers of the New World*, p. 252, 1943) list several common names which I have not seen on the labels of herbarium material: "courbaril (Haiti); bruta de danto (Hond.); . . . herairo (Peru), guarabu amarello, iauaranami, jutahy-rana, pororoca (Brazil), ingá-puita (Arg.)."

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Arnold Arboretum, Harvard University, Cambridge, Mass. (A)
Jardin Botanique de l'Etat, Bruxelles, Belgium. (B).
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TAXONOMY

CYNOMETRA L. Act. Soc. Upsal. 79. 1741 and Sp. Pl. ed. 1. 382. 1753.

Trees or shrubs. Stipules filiform, soon deciduous. Leaves simple or pinnately compound (exclusively unijugate in New World), the blades equilateral to inequilateral, usually acuminate, emarginate, the venation pinnately reticulate, the margin entire. Racemes or panicles. Racemes usually strobiliform in young state, usually one to several per axil, the bracts scarious or membranaceous, the bracteoles paired, not enveloping the young bud, deciduous. Flowers obviously pedicellate, occasionally articulate. Receptacle cup short, usually without a thickened disc. Sepals usually 4–5, but occasionally 2 or 3, free, imbricate, unequal, usually reflexed. Petals 5, usually equal in length; stamens 10 (8–12 by exception) glabrous, the anthers small, versatile, the filaments slender, usually very briefly united at base; stipe of pistil free in receptacle cup, the ovary usually hairy, the style slender, the stigma capitate, the ovules 1–2 (3 or 4 by exception). Legumes dehiscent or indehiscent, usually rugate or tuberculate on surface, occasionally smooth, the seeds 1–2.

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[4] True copal is obtained from a number of trees of the Leguminosae. *C. sessiliflora* Harms of the Old World is the only member of the genus known to yield copal.

Type species: *C. cauliflora* L.

KEY TO SECTIONS OF NEW WORLD CYNOMETRAS*

a. Ovaries hairy; fruit not reticulate.
  b. Leaflets obviously inequilateral; pedicels of flowers pubescent; larger bracts 2–5 mm. long; bracteoles present (some species uncertain) but soon deciduous........Section 1. COMATOVARIA Dwyer
  bb. Leaflets regularly equilateral; pedicels of flowers glabrous to scarcely pubescent; bracts about 1 mm. long, glabrous; bracteoles absent........Section 2. GUIANA Dwyer (Species 21. *C. hostmanniana*)

aa. Ovary glabrous; fruit reticulate........Section 3. NUMMUS Dwyer (Species 22. *C. fissicuspis*)

Section 1—COMATOVARIA Dwyer

a. Perianth obviously carnose........Subsection A—COMATOVARIA 1. *C. americana.*
aa. Perianth non-carnose........Subsection B—TENUIFLORA Dwyer
  b. Leaflets more than 2 cm. long (except some leaflets of *C. cubensis*, *C. microflora* and *C. duckei*), not narrow-lanceolate.
    c. Lowermost veins (if seen) well-spaced along costa and not spreading flabellately; legumes not velutinous (except possibly *C. spruceana*).
      d. Secondary veins visible above.
        e. Leaflets (1–)2–4 cm. long, obtuse or only vaguely acuminate. West Indies.
          f. Leaflets obliquely oblong-rotund or obliquely oblong, (1–)2–2.5 cm. long, obtuse at apex; petals 6–8 mm. long, obviously longer than sepals; legumes plump, papillate and scrobiculate........2. *C. cubensis.*
          ff. Leaflets narrow-oblong, 5.5 cm. long, obtuse or only vaguely acuminate at apex; petals up to 3.5 mm. long, as short or shorter than sepals; legumes compressed to turgid and with dark brown excrescences........3. *C. portoricensis.*
        ee. Leaflets 4–14 cm. long, acuminate. Mexico and tropical America.
          g. Largest leaflets 8–14 cm. long; legumes 2–4 cm. long, crustulose. Central America. (*C. trinitensis*?).
            h. Leaflets coriaceous; legumes turgid.
              i. Hairs densely disposed on valves of ovary.
                j. Leaflets narrow-oblong or oblong-lanceolate, 4–11 cm. long, 2–3.5 cm. wide, the secondary veins prominulous or immersed; fruit nutmeg-like in shape, the pericarp up to 3 mm. thick. Mexico, Guatemala, Honduras, and British Honduras........4. *C. retusa.*

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* In order to publish validly the new section and subsections the following latin descriptions are appended:

COMATOVARIA Dwyer, sect. nov.: Folia inaequilateralia. Pedicelli florum dense puberuli. Legumina non reticulata. Species typica: *C. americana* Vogel.

Subsect. COMATOVARIA. Sepala petalaque carnosa. TENUIFLORA Dwyer, subsect. nov. Sepala petalaque tenuia. Species typica *C. bauhiniaefolia.*

GUIANA Dwyer, sect. nov.: Folia aequilateralia. Pedicelli florum vix puberuli vel glabri. Legumina non reticulata. Species typica: *C. hostmanniana.*

NUMMUS Dwyer, sect. nov. Ovaria glabra. Legumina reticulata laevia compressa. Species typica: *C. fissicuspis.*

jj. Leaflets elliptic, 9–14 cm. long, 3–5 cm. wide, the secondary veins prominulous; fruit turgid but not rotund, the pericarp up to 2 mm. thick. Costa Rica........5. *C. hemitomophylla.*

ii. Hairs sparsely scattered on valves of ovary........6. *C. trinitensis.*

hh. Leaflets stiff-papyraceous to stiff-chartaceous.

k. Rachises 0.8–2 cm. long; pedicels 0.5–0.6 cm. long........7. *C. hondurensis.*

kk. Rachises 0.2–0.3 cm. long; pedicels up to 1.3 cm. long........8. *C. schottiana.*

gg. Largest leaflets 4–9 cm. long (except *C. cuneata* and *C. longifolia* often longer); legumes 1–2 cm. long (except *C. longicuspis* are longer), crustulose or rugulose. Mexico and tropical South America.

l. Leaflets minutely papillate (sub. mag.) (except *C. oaxacana*); costa prominulous; rachises of inflorescences 0.2–2 cm. long; pedicels of flowers up to 1.2 cm. long (except *C. marginata* var. *acuminata* up to 1.8 cm. long and *C. cuneata* up to 2 cm. long), the bracteoles attached basally.

m. Petioles 0.2–0.8 cm. long; rachises of inflorescences 3–10 flowered, 0.2–2 cm. long; petals 2.8–5.2 cm. long; hairs of ovary not uniformly appressed.

n. Leaflets stiff-chartaceous to thin-coriaceous; sepals 2.5–4.5 mm. long; petals 3–5 mm. long.

o. Leaflets oblong, sublanceolate or narrow-elliptic, 4–7 cm. long; 1.5–3 cm. wide, acuminate; sepals 3–4; wall of pericarp up to 1 mm. thick. Surinam, Venezuela, Brazil, British Guiana........9. *C. marginata.*

oo. Leaflets ovate-oblong to ovate-sublanceolate, 3.5–8 cm. long, 1.5–5 cm. wide, obtuse; sepals frequently only 2; wall of pericarp up to 0.5 mm. thick. Mexico........10. *C. oaxacana.*

nn. Leaflets coriaceous; sepals 2.0–3.5 mm. long; petals 2.3–5.2 mm. long.

p. Leaflets petiolulate for 1 mm.; lowermost veins of lamina sharply ascending; sepals 2.5–3.5 mm. long; petals 4.5–5.2 mm. long, 1.2–1.6 mm. wide........11. *C. crassifolia.*

pp. Leaflets not obviously petiolulate; lowermost veins ascending at about the same angle as upper veins; sepals 2–3 mm. long; petals 2.3–2.8 mm. long, 0.5–1 mm. wide........12. *C. stenopetala.*

mm. Petioles 0.5–1.8 cm. long; rachises of inflorescences 10–20 flowered, up to 2 cm. long; hairs of pistil uniformly appressed........13. *C. cuneata.*

ll. Leaflets rugulose (sub. mag.); costa usually plane above; secondary veins plane or immersed above; rachises of inflorescences 0.2–6 cm. long; pedicels of flowers 1–2 cm. long, the bracteoles (or scars) below middle but not strictly basal.

q. Rachises of inflorescences 0.2–2 cm. long; majority of bracts deciduous at anthesis; flowers up to 15 per rachis.

r. Legume obviously rugose........14. *C. spruceana.*

rr. Legume rough but not rugose........15. *C. longicuspis.*

qq. Rachises of inflorescences up to 6 cm. long; majority of bracts persistent at anthesis; flowers 30–50 per rachis........16. *C. longifolia.*

dd. Leaflets with secondary veins scarcely visible above (sub. mag.), non-papillate or rugulose above; fruit tuberculate........17. *C. duckei.*

cc. Lowermost pair of veins on wider side flabellately disposed and usually of same size basally as costa; legumes rugose and velutinous.

s. Leaflets obliquely ovate-oblong to ovate-lanceolate 1–4 cm. long, 0.5–2 cm. wide; pedicels pubescent........18. *C. bauhiniaefolia.*

ss. Leaflets ovate-rotund or oval-lanceolate, up to 2 cm. long, up to 1.5 cm. wide; pedicels glabrous........19. *C. microflora.*

bb. Leaflets less than 2 cm. long, narrow-lanceolate........20. *C. parvifolia.*

1. CYNOMETRA AMERICANA Vogel, in Linnaea 10:602. 1836.

Small tree. Branchlets glabrous, ultimately lustrous and rubescent, the lenticels pustulate. Petioles 0.4–1 cm. long, glabrous. Leaflets oblique-lanceolate, oblique-oblong or ovate-oblong, occasionally subtrapeziform, 5–14 cm. long, 2.5–5 cm. wide, tapering cuneately into an acumen, ultimately obtuse and retuse, the wider side tapering narrowly or frequently subauriculate at base, the costa prominulous above, the secondary veins prominulous above, more prominulous beneath, the lamina thin-coriaceous, rugulose above, papillate beneath, lustrous, inequilateral, glabrous. Bracts oblong or oblong-rotund, up to 2.5 mm. long, up to 2 mm. wide, puberulent dorsally and marginally. Bracteoles somewhat concave, oblong, up to 2 mm. long. Racemes 1–3 per axil, the rachises 0.1–0.5 cm. long, puberulent, the flowers about 10 per rachis; sepals 3–4, oblong-rotund, ovate-rotund to rectangular, 3.5–4.5 mm. long, 2–3.5 mm. wide, carnose, glabrous; petals obovate-oblong to oblong, 4.2–5 mm. long, 2–3.5 mm. wide, spatulate or obtuse at base, carnose; filaments 4.5–7 mm. long, carnose; anthers subrotund, 0.8–1 mm. long; ovaries oblong to subrotund, 2–3.5 mm. long, carnose, densely pubescent, the style 2.5–3.5 mm. long, carnose; legumes (here immature?) oblique-oblong, up to 1.5 cm. long, compressed, marcescent, finely velutinous.

HAITI: Les Atricots, *Eyerdam 310* (A, NY, US); Petionville, *Ekman H2343* (A, US); Port de Paix, *Ekman H4563* (A, US); vicinity of Jean Rabel, River Cote de Fer, *Leonard & Leonard 12748* (US).

C. *americana*, endemic to Haiti has several obvious distinguishing characteristics: the carnose perianth parts and the relatively large leaflets which are strikingly bicolor and which usually taper cuneately into an acumen. The carnose character of the perianth is not encountered in any other New World species, and is the chief reason for placing C. *americana* in a separate subsection.

2. CYNOMETRA CUBENSIS Rich. in de la Sagra Hist. Cuba 10:233. 1845. (T.: *de la Sagra s. n.*!).

Shrub or small tree. Branchlets glabrous, stiff, the lenticels obvious. Petioles 0.2–0.4 cm. long, glabrous to puberulent. Leaflets obliquely oblong-rotund or oblique-oblong, occasionally subtrapeziform, 0.8–2.5 cm. long, almost as wide as long, very inequilateral, the narrow side often 1/6th the width of the wide side, reticulose especially below, obtuse at apex, ultimately retuse, obtuse at base on wide side, vaguely papillate (under mag.), the costa prominulous above but evanescing apically, occasionally pubescent, the secondary veins about 7, subprominulous to subimmersed, the lamina coriaceous to thin-coriaceous, smooth and lustrous above, obviously inequilateral, glabrous. Bracts oblong-rotund to narrow-oblong up to 3 mm. long, ferrugineo-puberulent dorsally; bracteoles not seen. Racemes apparently one per axil, the rachises 0.5–1 cm. long, ferrugineo-puberulent, the flowers 6–10 per rachis, the pedicels 0.6–1.2 cm. long, about 0.6 mm. wide, ferrugineo-puberulent. Sepals 4–5, oblong to oblong-rotund, 4–6 mm. long, 1.5–3.2 mm. wide, pubescent basally within; petals lanceolate, 6–8 mm. long, 2–2.6 mm. wide, acute at apex, spatulate at base; filaments 7–11 mm. long, the anthers oblong, about 0.8 mm. long; ovary obliquely-oblong, about 3 mm. long, 1.8 mm. wide, densely pubescent, the style about 5 mm. long, subcrassate proximally, obviously eccentric. Legume obliquely elliptic, up to 3 cm. long, plump, granulose or crustulose, the wall of the pericarp up to 0.8 mm. thick.

CUBA: without locality, *Wright 2386* (G, US); Pinar del Río: Sierra de los Órganos, *Ekman 12684* (A, G), *12978* (A, US); Morillo, *Ekman 17375* (A, G, NY); Buenavista, Cayajabos, *Léon 13552* (NY), *13805* (NY); Río Francisco, *Ekman 18204* (A, NY); Valenzuela (?), *de la Sagra s. n.* (P); Havana, *de la Sagra 307* (A, G).

C. cubensis is closely allied to the only other West Indian species, *C. portoricensis.*[5] Both have unusually small obtuse to vaguely acuminate leaflets. The Cuban species has more or less orbicular leaflets in contrast to the narrow-oblong blades of *C. portoricensis.* The flowers of *C. cubensis* are much larger and the rachis of the racemes more elongate. The fruits are more turgid with the crustulose excrescences less prominent than in its ally.

The de la Sagra collection in Paris is probably the type despite the fact that the locality on the label (Valenzuela) does not agree with the cited type locality: "Vuelta de Abajo." It is an excellent match for the illustration (plate 41) in de la Sagra's *Hist. Cuba* 1845.

In several dissections the sepals proved to be puberulent at the base within. This was not observed in the calyx of any other New World *Cynometra.* The type description indicates that "filaments (stamens) . . . subvillosa". This was not observed and is probably an error inasmuch as the filaments of all cynometras are glabrous. The common name of *C. cubensis* is "Pico de Gallo."

3. CYNOMETRA PORTORICENSIS Krug and Urban, in Symb. Ant. 1:312. 1899. (T.: *Sintenis 5600*!).

Small tree. Branchlets somewhat smooth, rimose, glabrous, the lenticels often papillate. Petioles 0.2–0.3 cm. long, puberulent. Leaflets narrow-oblong to oblong or lanceolate, 1.6 cm. long, 0.5–2.6 cm. wide, obtuse to vaguely obtuse-acuminate at apex, obtuse to subauriculate at base on wide side, the costa prominulous above but evanescing apically, the secondary veins ± 10, often plane or subimmersed above, the lamina reticulate especially below, not papillate above, vaguely papillate below, coriaceous, lustrous, inequilateral to equilateral, glabrous. Bracts ovate-rotund, about 2 mm. long; bracteoles not seen. Racemes apparently solitary in the axils, the rachises up to 0.5 cm. long, puberulent, the flowers few per rachis, the pedicels 0.4–0.6 cm. long, densely pubescent; sepals 4–5, oblong, about 5 mm. long; petals oblong, 2.5–3 mm. long, obtuse to subspatulate at base, white in vivo; filaments up to 5 mm. long, the anthers oblong, 0.8–1 mm. long; ovaries densely pubescent, the style about as long as ovary. Legume oblong, 2.5–3 cm. long, 1.5–1.8 cm. wide, compressed or turgid, the surface with crustaceous excrescences, velutinous or glabrous, the wall of pericarp about 1 mm. thick.

PUERTO RICO: near Rincón "ad Quebrada el Salto", *Sintenis 5600* (A, B, G, P, U, W); Barrio Rosario near Mayagüez, *Cowles s. n.* (US); near Arecibo, *Cowles 347* (NY), *2048* (NY); Rosario, San Germán (NY); Vega Alta, *Gleason & Cook A-21*, *A-136* (NY).

DOMINICAN REPUBLIC: Barahona, *Fuertes 1452* (NY, P); Santo Domingo City, Río Oxuma, *Ekman 12511* (A, US); Com. Palmar, *J. Jiménez 2495* (US); Lopez, Prov. Santiago, *Jiménez 458* (US).

The description of the flowers is of particular interest inasmuch as Krug & Urban did not include this in their original diagnosis. Noteworthy is the fact that the petals are shorter or barely as long as the sepals. Krug and Urban originally described the legumes as "postremo dehiscentia." This seems questionable especially in view of the fact that the herbarium material lacks dehiscent fruits. As indicated in the introduction, legumes with regular dehiscence are not found in the New World cynometras.

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[5] This statement is based on the assumption that *C. trinitensis* is not a West Indian species.

4. **CYNOMETRA RETUSA** Britton and Rose, in Trop. Woods 7:5. 1926. (T.: *Record 8832*!).

Small tree. Branchlets smooth, glabrous to puberulent, the lenticels often scattered-punctate. Petioles 0.4–0.7 cm. long, glabrous to puberulent. Leaflets narrow-oblong to lance-oblong, 4–11 cm. long, 1.2–4 cm. wide, usually attenuate-acuminate at apex, often falcately so, obtuse or cuneate at base on wide side, the costa prominulous above, the secondary veins ± 10, prominulous or immersed, the lamina vaguely to obviously rugulose or papillate above, papillate beneath, thin-coriaceous, lustrous above, inequilateral, glabrous. Bracts disposed as a lanceolate cluster in bud, up to 2 cm. long, ovate to ovate-lanceolate, 3.5–5 mm. long, densely puberulent dorsally; bracteoles oblong, about 2 mm. long, ciliate on back, soon deciduous. Racemes apparently solitary in the axils, the rachises 0.4–0.6 cm. long, puberulent, the flowers 10–20 per rachis, the pedicels slender, 0.4–1.5 cm. long, about 0.35 mm. wide, ferrugineo-villose. Sepals 4–5, oblong, 2.8–5.2 mm. long, 1.5–2 mm. wide, sparsely ciliate at apex and on margins; petals obovate-oblong to oblong, 5–6.5 mm. long, 0.8–2 mm. wide, obtuse to subacuminate at apex, subspatulate at base; filaments of stamens up to 7 mm. long, the anthers oblong, 0.7–1.2 mm. long; ovaries obliquely oblong, densely lanate, the styles 2–3.2 mm. long. Legumes oblong-rotund to inequilaterally oblong, up to 1.8 cm. long, 1.8 cm. wide, nuciform, minutely apiculate, the surface minutely crustose, the pericarp wall about 3 mm. thick.

MEXICO: TABASCO: Nacajuca, *Rovirosa 748* (US).

GUATEMALA: Los Andes, *Record 8832* (NY, Y); ALTA VERAPAZ: Chinajá, *Steyermark 45565* (F, US); Cubilguitz, *Steyermark 44557* (F); IZABAL: Río Chaciún, Jocoló, *H. Johnson 1291* (F, US); Quiriguá, *Standley 24254* (NY, US); near Cristina, *Steyermark 38671* (F).

HONDURAS: YORO: Progreso, *Hottle 23* (F); ATLÁNTIDA: San Alejo (?), *Standley 7873* (F); Tela, *Standley 52915* (A, F, NY, US), *56686* (A, F, G, NY, US); La Ceiba, *Yuncker, Koepper & Wagner 8007* (F, G, MO, NY, US).

BRITISH HONDURAS: *British Honduras Forest Dept. 5* (Y).

This relatively well collected species is, according to S. J. Record (cf. Britton & Rose's original description), " . . . one of the commonest trees of the forest" (Guatemala). The narrowly oblong to oblong-lanceolate leaflets, lustrous above, are striking. The densely flowered and compressed racemes resemble those of *C. trinitensis* but their rachises are shorter. The thickness of the wall (3 mm.) of the small nutmeg-like fruits is noteworthy. According to Record and Hess (*Timbers of New World* p. 252, 1943) the vernacular name is "pata de cabra" (goat's foot) because of the fancied resemblance of the paired leaflets to the foot of a goat.

5. CYNOMETRA HEMITOMOPHYLLA (Donn. Sm.) Donn. Sm. in N. Am. Fl. 23: 220. 1930. (T.: *Tonduz 7012!*).

Copaifera hemitomophylla Donn. Sm. in Bot. Gaz. 27:332. 1899.

Tree. Branchlets zig-zag, nodose or gnarled, glabrous, the lenticels numerous, small, and verrucose. Petioles 0.6–0.8 cm. long, glabrous. Leaflets elliptic, 9–14 cm. long, 3–5 cm. wide, obviously acuminate at apex, the wide side obtuse at base, the lamina reticulate, papillate (under mag.) especially above, the costa subprominent above, the secondary veins 15–20, curving arcuately near margin to join veins above, thin-coriaceous, inequilateral, curved falcately, glabrous. Bracts, bracteoles, and flowers not known. Rachises of racemes (in fruit) 0.5–1 cm. long, apparently solitary in the axil, glabrous. Pedicels 1–1.5 cm. long, 0.3–0.4 cm. wide, glabrous. Legumes suborbicular, 3–4 cm. long, up to 3.5 cm. wide, nuciform, the surface crustose-granular, the excrescences deciduous, the wall of the pericarp up to 2.8 mm. thick.

COSTA RICA: LIMON: Río Reventazón below Cairo, *Standley & Valerio 48799* (US); Santo Domingo de Osa (Golfo Dulce), *Tonduz 9972* (MO, NY); Palmar Norte Río Terraba, *Paul & Dorothy Allen 5264* (MO).

C. hemitomophylla, with perhaps the largest leaflets of the New World cynometras (*C. hostmanniana* excepted), is unfortunately known only from fruiting material.[6] The principal secondary veins of the leaflets are more numerous (15–20) than in any other species. Another character of especial interest is the glabrous pedicel of the fruit.

The local name of *C. hemitomophylla* is "Guapinol Negro" and the common name is "Cativo" (fide P. Allen, loc. cit.).

6. CYNOMETRA TRINITENSIS Oliver, in Hook. Ic. 2443. 1896.

Small tree. Branchlets smooth, glabrous or puberulent, the lenticels inconspicuous. Petioles 0.6–1 cm. long, puberulent; petiolules 1–2 mm. long. Leaflets obliquely ovate or oblong, 5–11 cm. long, 1.5–4.5 cm. wide, vaguely to obviously acuminate at apex, tapering acutely or cuneately on wide side, the costa prominent, the secondary veins 10–12, prominulous, the lamina inequilateral, coriaceous, smooth or rugulose above and below, lustrous, glabrous, obviously inequilateral, the intervenal areas rather indistinct above. Bracts rotund to ovate-lanceolate, 3–6 mm. long, 1.5–3.5 mm. wide, densely puberulent dorsally; bracteoles oblong, up to 4.2 mm. long, 0.5–0.8 mm. wide, carinate and densely puberulent dorsally. Racemes 1–3 per axil, the rachises 0.8–1 cm. long, puberulent, the flowers about 15 per rachis, the pedicels up to 0.8 cm. long. Sepals usually 4, oblong to subrotund, 3–3.5 mm. long, 1.5–3 mm. wide, puberulent dorsally at apex and base; petals lanceolate to oblong-lanceolate, 4–5.8 mm. long, 1.3–2 mm. wide, tapering toward base; filaments 4.5–6 mm. long, the anthers 0.6–0.9 mm. long; ovary oblong, about 2.5 mm. long, about 1.5 mm. wide, villose especially basally and on sutures, the hairs scattered on valves, the style 4–5 mm. long. Legume rotund, 2–4 cm. long, 2–4 cm. wide, the pericarp smooth, minutely granulose or crustulose, 2–2.5 mm. thick.

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[6] Paul Allen writes (*The Rain Forest of Golfo Dulce Costa Rica* p. 191. 1956), that the flowers of *C. hemitomophylla* are "pale-brown [and] are produced from late August to nearly November."

JAMAICA: Castelton Garden, collector ?, *collection no. 11* (NY).
TRINIDAD: Botanical Garden, collector ? (G); Government House grounds, *Broadway s. n.* (NY, US, P); Botanical Garden, *Britton 1183* (NY, US).
BRITISH GUIANA: Botanical Garden, Georgetown, collector ? (BRG).

C. trinitensis bears a striking resemblance to the Costa Rican *C. hemitomophylla* which unfortunately is known only from fruiting material. The principal secondary veins of the leaflets of *C. hemitomophylla*, however, are more numerous and proximate. The densely flowered and compressed racemes resemble those of *C. retusa*. The latter species, however, has more narrow leaflets, a shorter rachis, apparently longer sepals, and a densely hirsute ovary. The reduction in the number of hairs on the ovary is the most conspicuous floral character of *C. trinitensis* and is unique for the New World cynometras, *C. fissicuspis* and possibly *C. stenopetala* excepted. In the plate accompanying the original description this character was not accurately depicted despite the reference in the text to "ovario parce piluloso."

The type collection (obviously from Trinidad) was not located. Oliver, following the original diagnosis, states: "Trinidad, Crueger, Prestoe etc." Whether the species is native to Trinidad is not certain.

7. CYNOMETRA **hondurensis** Dwyer, sp. nov. (T.: *Schipp 1192* (A)!).

Arbores parvae. Ramuli laeves glabri saepe lenticellis inconspicuis. Folia glabra. Petioli 0.6–0.8 cm. longi. Foliola sessilia anguste oblongo-lanceolata, 6–12 cm. longa, 1.8–4.5 cm. lata, apice plerumque attenuato-acuminata, acumine circ. 1 cm. longo saepe subfalcate disposito, ultime emarginato, subequilateralia vel evidenter inequilateralia latere lato basi cuneata, latere angusto attenuato, costa supra prominula infra subprominente, venis secundariis principalibus ± 15 prominulis, laminis reticulosis tenui-coriaceis vel rigide chartaceis supra in siccitate obscure olivaceis. Racemi compressi, rhachidibus (hic alibus in fructu) 0.8–2 cm. longis, circ. 0.12 cm. latis puberulis. Bracteae bracteolaeque non visae. Sepala 4, oblonga, 2.5–3.8 mm. longa, 1–1.8 mm. lata, acuta vel acuminata (rare obtusa) omnino glabra praeter dorso basim puberulo; petala alba in vivo, anguste ovato-lanceolata vel angusto-oblonga, 3.2–4.6 mm. longa, 0.8–1 mm. lata, acuminata vel vix obtusa; antherae non visae; ovaria omnino pubescentia comis aliis appressis, valvis oblongis, 2.3–2.5 mm. longis, 1.5–1.8 mm. latis, stylo circ. 2.5 mm. long. Legumina (hic juvenilia) impare obovato-oblonga, 2.3 cm. longa, 1.5 cm. lata, apiculata compressa minute crustulosa.

BRITISH HONDURAS: Rio Grande River, *Schipp 1192* (A, G, MO, NY).

The foliage of the new species closely resembles that of *C. retusa* and *C. schottiana*, differing from the former in having only thin-coriaceous or stiff-chartaceous leaflets, much longer rachises of the inflorescences, longer petals, and larger and more compressed fruits. *C. schottiana* on the other hand, has much larger and more numerous flowers, shorter rachises of the racemes, more elongate pedicels, and sepals with hairs restricted marginally. Like *C. retusa*, the new species bears apiculate fruits.

8. Cynometra schottiana Hochr. in Bull. N. Y. Bot. Gard. 6:275. 1910. (T.: *Schott XII 857*!).

Tree. Branchlets glabrous, the lenticels obvious and numerous. Petioles 0.6–1 cm. long, glabrous. Leaflets oblong to oblong-lanceolate, 8–13 cm. long, 3–5.5 cm. wide, the acumen up to 1.5 cm. long, obtuse to subauriculate on wide side at base, the costa subprominent, the secondary veins up to 20, prominulous, uniting near margin to form an undulating vein subparallel to margin, the lamina scarcely stiff-chartaceous, obviously inequilateral, glabrous. Bracts ovate or oblong, puberulent dorsally; bracteoles not seen. Racemes apparently one per axil, the rachises 0.2–0.3 cm. long, puberulent, about 3-flowered. Sepals 4–5 (often two almost completely united marginally), oblong-lanceolate to oblong, 4–5.3 mm. long, 1.8–2.8 mm. wide, glabrous except puberulent marginally; petals lanceolate, 6–7 mm. long, about 2 mm. wide, acute to acuminate at apex; filaments up to 9 mm. long, the anthers about 1 mm. long; ovaries densely pubescent, the style 2–3.8 mm. long. Legume oblong (here very immature).

Colombia: el chocó: Atrato and Truando Rivers, *Schott XII 857* (NY).

The few-flowered racemes and the elongate petals exceeded in length only by those of *C. cubensis* and *C. cuneata*, are noteworthy. Hochreutiner in his original description erred in describing the sepals as glabrous. The common name is "Tremantino".

The type collection in New York bears the collection number "*XII 857*" and not simply "*7*" as listed by Britton & Killip (Ann. N. Y. Acad. Sciences 35:193. 1936).

9. Cynometra marginata Benth. in Hook. Lond. Jour. Bot. 2:100. 1840.

Tree. Branchlets rough, usually conspicuously lenticellate, glabrous to puberulent. Petioles up to 3.5 mm. long, glabrous to puberulent. Leaflets sessile, oblong, sublanceolate or narrow elliptic, 4–7 cm. long, 1.5–3 cm. wide, scarcely attenuate to acuminate, emarginate, the wider side subauriculate to scarcely obtuse at base, the costa prominulous above and below, the principal secondary veins 10–15, immersed to prominulous above, prominulous to subevanescent below, the lamina thin-coriaceous, inequilateral to subequilateral, minutely papillate to rugulose above and below, reticulate, glabrous, the margin often thin-callose, occasionally crisp. Bracts oblong, up to 2 mm. long, densely pubescent on back. Bracteoles oblong, up to 1.5 mm. long, obviously carinate, the hairs elongate along carina. Racemes 1–2 per axil, the rachises 0.2–1.8 cm. long, 8- to 15-flowered, densely aureo-puberulent, the pedicels 0.5–1 cm. long, about 0.35 mm. wide (at anthesis), puberulent. Sepals 3–4, often 2 united marginally, almost completely or only to middle, ovate-oblong,

oblong-rotund to narrowly ovate-oblong, 2.5–6.5 mm. long, 2–5 mm. wide, obtuse to subacute at apex, puberulent to scattered-villose on back, the hairs often confined below middle; petals narrow-lanceolate to narrow-oblong, 3.5–7 mm. long, 1–3.5 mm. wide, acuminate to obtuse at apex, obtuse to somewhat clawed at base; filaments of stamens up to 13 mm. long; the anthers 0.6–1.1 mm. long; ovary oblong, up to 3 mm. long, densely hirsute, most hairs elongate and ascending, some shorter and more flaccid, the style 2.8–4 mm. long. Legume oblong, up to 2 cm. long, vaguely rugulose to somewhat smooth, crustulose, the pericarp about 1 mm. thick.

KEY TO THE VARIETIES

Leaflets obviously reticulate.
  Leaflets oblong, sublanceolate or narrow-elliptic, scarcely acuminate, coriaceous..9a. *C. marginata* var. *marginata.*
  Leaflets elliptic, obviously acuminate, the acumen 1–1.5 cm. long, chartaceous..9b. *C. marginata* var. *guianensis.*
Leaflets smooth and not reticulate................................9c. *C. marginata* var. *laevis.*

9a. CYNOMETRA MARGINATA var. MARGINATA.

PANAMA: Savanna north of Panama City, *Brother Paul 463* (F); Paraíso Station, *Hayes 29* (K).

SURINAM: without specific locality, *B. W. 658* (U); Forest Reserve Section, *B. W. 1257* (U); Kaboerie, *B. W. 4885* (K, NY, U); Sectie O, *B. W. 5868* (MO, U); Sectie O, *B. W. 6086* (U); Tibiens River, *Tresling 300* (U); Coppename River near Raleighfalls, *Lanjouw 858* (MO, U); Surinam River near Kabel, *Lanjouw 1219* (K, NY); Marowijne River, *Lanjouw & Lindemann 2964* (U); Saramacca River Headwaters, *Maguire 23906* (NY); Boachland, Saramacca River, village Jacob Kondre, *Maguire & Maguire 23856* (F, MO, NY, V); Posoegronoe, Saramacca River, *Maguire & Maguire 24040* (MO, NY, U); Boaschland, *Maguire 24040a* (U, V).

BRITISH GUIANA: *British Guiana Forest Dept. 6217* (NY, U).

VENEZUELA: Río Orinoco between mouth Río Atabapo and Cano Masagua, *Level 89* (NY); BOLÍVAR: Cerro Guaiquinima, 1 mile above Raudal Aquacanta, *Maguire 32705* (NY, V); Laguna de los Chivos (Municipo Upata), *Delgado 216* (V).

BRAZIL: PARÁ: without specific locality, *Schomburgk 197 (169)* (F, K, V, W); Remansao, Tocantins, *Froes 23600* (NY); Rio Capim between Aproagu and Igarapé Canduru; Rio Tapajoz, *Ducke 16898* (R).

C. marginata is apparently the most difficult of all the New World cynometras to circumscribe because of the variability of its leaflets, which are typically thin-coriaceous, narrowly lanceolate, and scarcely attenuate apically. While the minutely papillate laminae furnish a character permitting one to segregate it from its ally, *C. spruceana*, nevertheless, other foliage characters are not stable, viz. the reticulate surface and the prominulous character of the secondary veins. The rachises of the racemes are strikingly variable in length, apparently an unusual feature for the New World cynometras. Other characters, perhaps of secondary importance, are the occasional reduction of sepals to 2, occasionally glabrous sepals, and the variability in the length and width of the petals. The reduction in number of sepals to 2 is otherwise found only in the Mexican *C. oaxacana*.

9b. Cynometra marginata var. **guianensis** Dwyer, var. nov. (T.: *Schomburgk 777* (NY)!).

Foliola elliptica, 3–8 cm. longa, 1.2–3 cm. lata, conspicue attenuato-acuminata acumine 1–1.5 cm. longo, costa supra plerumque pubescente, chartacea, plerumque vix inaequilateralia.

Surinam: Nicckerie, *Gongyryp & Stahel 1010* (U).
British Guiana: without specific locality, *Richard Schomburgk s. n.* (G, U, W); *Richard Schomburgk 1533* (U); *Robert Schomburgk (Herb. Hance 7667)* (W); *Schomburgk 777* (NY, V, W).
Venezuela: bolívar: Alto Río Paragua, *Cardona 884* (US).

The Schomburgk collections of the new variety are recognized with ease inasmuch as the leaflets are strongly attenuate-acuminate and chartaceous. The material from Surinam and Venezuela was difficult to assign to this taxon.

9c. Cynometra marginata var. **laevis** Dwyer, var. nov. (T.: *Froes & Murça 24014* (NY!)).

Foliola laevia nitida venis secundariis supra evanescentibus. Fructus globosi suturis conspicuis.

Brazil: pará: Rio Capini between Aproaga and Igarapé Candiri, *Froes & Murça 24014* (NY).

The glossy leaflets with the secondary veins scarcely visible mark the new variety. The fruit is more rotund than in C. *marginata* var. *marginata*. It is difficult to say whether the conspicuous sutures of the valves represent a substantial distinguishing character inasmuch as fruiting material of C. *marginata* is so poorly represented in herbaria.

10. Cynometra oaxacana Brandgee, in Univ. Cal. Publ. Bot. 6:180. 1915. (T.: *Purpus 7383*!).

Cynometra colimensis Britton and Rose, N. Am. Fl. 23: 220. 1930. (T.: *Ferris 6237*!).

Shrub to large tree. Branchlets glabrous or puberulent, the lenticels prominent. Petioles about 0.5 cm. long, glabrous. Leaflets obliquely ovate-oblong, ovate-lanceolate, rarely oblong-subrotund or narrow-oblong, 3.5–8 cm. long, 1.5–5 cm. wide, obtuse on wide side at base, the costa prominent or prominulous, the secondary veins ± 10, prominulous, the lamina vaguely to obviously papillate above (sub mag.), reticulate above and below in thinner more mature leaves, thin-coriaceous, very inequilateral, glabrous. Bracts oblong to ovate-oblong, 2.5–3 mm. long, up to 3 mm. wide, puberulent dorsally and marginally; bracteoles located about 1 mm. from base of pedicel, oblong, up to 2 mm. long, carinate, scattered pubescent on back. Racemes one to 3 per axil, the rachises 0.5–2 cm. long, ± 8-flowered; pedicels 0.6–1.2 cm. long, densely aureo-pilose; sepals 2–5, often a pair fused below middle, oblong, ovate-oblong to ovate, 2.5–4 mm. long, 1.2–3 mm. wide (or up to 4 mm. wide if 2 fused), glabrous or puberulent dorsally; petals oblong to obovate-oblong, 3.5–5 mm. long, 1–1.6 mm. wide, often subfalcately disposed, obtuse to vaguely clawed at base; filaments up to 7 mm. long, the anthers subrotund, 0.7–1 mm. long, 0.6–8 mm. wide; ovaries obliquely oblong to subrotund, 3–4.5 mm. long, 2–2.5 mm. wide, densely pilose, style up to 3.5 mm. long, subcrassate, glabrous to pilose above middle. Legume oblong, up to 3 cm. long, up to 1.6 cm. wide, minutely granulose or crustulose, the wall of the pericarp up to 0.5 mm. thick.

Mexico: without locality, *Hinton 10893* (U); colima: Manzanillo, *Ferris 6188* (US), *6237* (A, NY); guerrero: La Lagunilla, *Nelson 7004* (US); Zihuatanejo, *Langlassé s. n.* (P), *Langlassé 441* (F, G, US); oaxaca: Cerro de Picacho, *Purpus 7383* (F, LA, MO, NY); chiapas: Aguacate Palenque, *Matuda 3796* (F, NY).

Two characters mark C. *oaxacana*: the oval-oblong or ovate-oblong leaflets scarcely acuminate at the apex and the reduction in the number of the sepals (2–3). Some of the smaller leaflets of *Purpus 7383* (MO) have a thick lamina which is not obviously papillate and reticulate below, thus differing markedly from the larger leaflets. A similar variation in the thickness, surface character, and venation of the leaflets on a single collection (*Spruce s. n.* (K), type of C. *spruceana* var. *spruceana*) was encountered.

11. Cynometra crassifolia Benth. in Hook. Lond. Jour. Bot. 2:100. 1840.

Small tree. Branchlets often wiry and zig-zag, angular in cross-section, rough or smooth, glabrous or puberulent. Petioles 0.4–0.8 cm. long, slender, glabrous or puberulent. Petiolules up to 0.1 cm. long. Leaflets oblong-lanceolate, ovate-lanceolate, rarely subtrapezoid, 3.6–9 cm. long, 1.5–4 cm. wide, short-acuminate at apex, the wide side obtuse or tapering narrowly at base, the costa prominulous, glabrous to puberulent, the secondary veins prominulous, the most basal 1 or 2 strict and spreading flabellately, the upper arcuate-ascending, plane or prominulous above, prominulous and conspicuous beneath, the lamina minutely papillate above and below, reticulate, subcoriaceous or stiff-chartaceous, inequilateral, the wide side usually thrice the diameter of the narrow side, glabrous above, glabrous or puberulent below. Bracts ovate to subrotund, up to 2 mm. long; bracteoles not seen. Racemes solitary in the axils, the rachises up to 0.5 cm. long 8- to 10-flowered. Pedicels 0.6–1.2 cm. long, about 0.7 mm. wide in middle. Sepals 4, ovate to oblong, 2.5–3.5 mm. long, 1.3–2.8 mm. wide, puberulent dorsally; petals narrow-oblong, narrow-lanceolate to obovate-oblong, 4.5–5.2 mm. long, 1.2–1.6 mm. wide, obtuse to somewhat clawed at base; filaments up to 8 mm. long, the anthers oblong, about 0.6 mm. long; ovaries obliquely oblong, completely pubescent. Mature legumes not seen.

Brazil: locality and collector unknown (P, probable type); without specific locality, *Geoffrey* (?) *s. n.* (P).

Ecuador: manabi: Recreo, *Eggers 15752* (F, US); oro: Piedras, *Little 6622* (US).

In the herbarium in Paris I located a specimen labeled *Cynometra crassifolia* Benth. ex ipso Brésil. This is probably the type inasmuch as Bentham, in describing C. *crassifolia*, stated that "I have seen the three following American species in the Paris Herbarium" (including C. *crassifolia*).

12. CYNOMETRA **stenopetala** Dwyer sp. nov. (T.: *Krukoff 6631* (NY)!).

Arbores 18–30 m. altae. Ramuli laeves glabri. Petioli 2–5 mm. longi, marcescentes glabri. Foliola 2 sessilia inaequilateralia vix falcata oblique oblongo-lanceolata vel oblonga, 3–8 cm. longa, 1–3.3 cm. lata, breviter acuminata retusaque, latere angusto gradatim attenuato, latere lato obtuse disposito, costa utrimque subprominente glabra, venis secundariis principalibus 10–12 prominulis vix ascendentibus ultime venam marginalem conspicuam dispositis, coriacea laevia brunnea glabra?. Racemi fasciculati rhachidibus plerumque pluribus per axillam, 1–7 (–10) mm. longis. Bractae crebrae mox deciduae ovatae vel ovato-rotundae intus glabrae extus puberulentes. Bracteae oblongae, circ. 2.5 mm. longae, 0.5 mm. latae, carinatae dorso ciliatae infra medium pedicellorum affixae. Flores 4–10 per rachidem. Pedicelli (hic in fructu) circ. 6.5 mm. longi, circ. 0.8 mm. lati, lignosi. Sepala 4, oblonga vel ovata-oblonga, 2–3 mm. longa, 0.9–2 mm. lata, obtusa glabra praeter dorso marginibusque; petala lanceolata, circ. 2.8 mm. longa, circ. 1 mm. lata, acuta basi subspathulata glabra; stamina 10, filamentibus vix basi cohaerentibus, ad 6.5 mm. longis, circ. 0.1 mm. latis, antheris non visis; legumina turgida subrotunda, ad 1.3 cm. longa, in forma nuculae constructa suturis copiose aliter sparse pubescentibus, crustulosa vel granulosa pericarpio spongioso, ad 3 mm. crasso, seminibus solitariis loculum explentibus.

BRAZIL: AMAZONAS: Humayatá near Livramento on Rio Livramento, *Krukoff 6631* (A, NY, U, US); Humayatá near Tres Casas, *Krukoff 6439* (A, F, NY, US); São Paulo de Olivença near Palmares, *Krukoff 8418* (U).

All of the specimens are in the late flowering or juvenile fruit stage. Fortunately sepals and to a less extent, petals may be found after a careful search. The petals, not exceeding 2.8 mm. in length are smaller (2–3 mm.) than those of any of the other New World cynometras except *C. bauhiniaefolia* and *C. microflora*. On the basis of leaflet venation, however, the species appear unrelated, inasmuch as *C. stenopetala* has the principal secondary veins on the wider side of the lamina regularly spaced, while *C. bauhiniaefolia* and *C. microflora* have the lowermost 2 or 3 secondary veins flabellately disposed. Vegetatively the new species appears to be closely related to *C. spruceana*. The short-pedicelled flowers borne on short rachises scarcely resemble the long-pedicelled flowers of *C. spruceana* which are disposed in lax racemes on relatively elongate rachises. *C. stenopetala* seems to be more closely related to *C. marginata* and to *C. crassifolia*; it is readily distinguished from these by its more coriaceous leaflets, smaller sepals and petals, and the ovary (judging from the condition of the juvenile fruit) presumably bearing only few hairs on the valves. Reduction in the number of ovarian hairs is elsewhere encountered only in *C. trinitensis*.

13. CYNOMETRA CUNEATA Tul. in Arch. Mus. Paris 4:179. 1844. (T.: *Richard s. n.*!).

Tree. Branchlets smooth, drying silver-brown, puberulent, the lenticels inconspicuous. Petioles 0.5–1.8 cm. long, crassate, glabrous. Leaflets rhomboid-

ovate to elliptic-lanceolate, 6–11 cm. long, 2.3–4.3 cm. wide, the acumen up to 1.2 cm. long, or short-acuminate to almost obtuse, obviously obtuse at base on wider side, the costa prominulous above, usually rather prominent beneath, glabrous, the principal secondary veins ± 15, very prominulous but rather evanescent above, prominulous beneath, the margin thin-callose, the lamina thin-coriaceous, minutely papillate above and below, scarcely to obviously inequilateral, obviously reticulate below, glabrous. Bracteoles narrow-oblong, up to 3 mm. long, puberulent on back, attached basally. Racemes prominent, usually one per axil, the rachises slender, 2–3.5 cm. long, 10- to 20-flowered, puberulent, the pedicels 0.8–2 cm. long, about 0.5 mm. wide (up to 1.5 mm. wide in fruit), scarcely pubescent, smooth, rubescent. Sepals oblong, 4–5.5 mm. long, 2–2.8 mm. wide, obtuse, glabrous except for few scattered hairs at apex; petals lanceolate to obovate-oblong, 7–7.5 mm. long, 1.6–2.2 mm. wide, acute to obtuse at apex; filaments up to 9 mm. long, the anthers 0.8–1 mm. long; ovary oblong, about 3.5 mm. long, about 2.2 mm. wide, the hairs dense, appressed, sericeous. Legumes oblong, up to 3.3 cm. long, up to 1.5 cm. wide, plump, finely rugulose, crustulose or minutely papillate, velutinous at first, then glabrate or glabrous.

VENEZUELA: BOLÍVAR: Raudal Arutani, Alto Paragua, Guayana, *Cardona 865* (V). BRAZIL: PARÁ: without specific locality, *Richard s. n.* (P); Juruá, *Ducke 16894* (K, US); Belém do Pará, *Ducke 20208* (US); Caracari, Rio Branco, *Kuhlmann 1067* (R); RIO DE JANEIRO: without specific locality, *Glaziou 13756* (G).

The relationship of C. *cuneata* and C. *spruceana* is suggested by their similar foliage. C. *cuneata*, however, has longer petioles, often rhomboid-ovate leaflets which are papillate and bear prominulous secondary veins. Likewise the rachises and pedicels are longer, the flowers more numerous and the petals longer, thus suggesting closer relationship with C. *longifolia*. Unlike C. *spruceana* the bracteoles are attached basally. The uniformly appressed hairs of the ovary are unique among the New World cynometras.

14. CYNOMETRA SPRUCEANA Benth. in Mart. Fl. Bras. 15(2):247. 1876. (T.: *Spruce s. n.* ?)

Small trees; branchlets smooth, glabrous to puberulent; petioles 2–7 mm. long, usually puberulent; petioles absent or up to 1 mm.; leaflets narrow-oblong, subovate-oblong to obovate oblong, 2–8.5 (10) cm. long, 1–4 cm. wide, vaguely to obviously acuminate at apex, ultimately emarginate, oblique at base, the wider side tapering obtusely, or subtruncate at base, the narrow side acute (tapering usually beginning near middle part of blade), the costa plane to prominulous above, often with groove on each side, prominulous below, the secondary veins scarcely prominulous to plane or immersed (?) above, the margin regular, occasionally revolute, thin to moderately thick-coriaceous, obviously inequilateral, rugulose, often obviously reticulate below; racemes usually 1–2 per axil, the rachis slender, puberulent, 0.7–2 cm. long, (6-) 10- to 15-flowered, the pedicels filiform (about 0.5 mm. wide), 0.5–2 cm. long, densely puberulent; bracts soon deciduous, oblong-rotund to rotund, up to 5 mm. long and 5 mm. wide, densely or moderately puberulent on back and margins; bracteoles deciduous, up to 3 mm. long, densely puberulent on back, carinate, thickened apically, the bracteole scars 2–5 mm. above proximal end of pedicel; sepals 4 (or 3 by fusion of 2), oblong, ovate-oblong to subrectangular, 3–4.8 mm. long, 1–2.3 (–3) mm. wide, obtuse to subacuminate at apex, usually obviously puberulent on back, often ciliate on margins; petals oblong to obovate-oblong, 5–7.5 mm. long, 1.8–2.3 (–3.2) mm. wide, obtuse to acuminate at apex, vaguely to obviously clawed at base; filaments 5–10 mm. long, the anthers 0.9–1.3 mm. long, 0.5–0.7 mm. wide; ovaries oblique-oblong, 2–3.8 mm. long, 1–2 mm. wide, densely pubescent, the style up to 5 mm. long; legume oblong to subrotund, 2.5–3 cm. long, 1–1.5 cm. wide, the suture of valves distinct, plump, obviously rugulose, minutely granulate and puberulent.

KEY TO THE VARIETIES

Leaflets conspicuously or only vaguely acuminate at apex....................14a. *C. spruceana* var. *spruceana.*
Leaflets obviously obtuse at apex..14b. *C. spruceana* var. *phaselocarpa.*

14a. CYNOMETRA SPRUCEANA var. SPRUCEANA.

Trachylobium martianum Hayne, in Flora 10(11):744. 1827.
Cynometra spruceana var. *β procera* Benth. in Mart. Fl. Bras. 15^2:248. 1876. (T.: *Spruce 3479*!).
Cynometra spruceana var. *γ macrophylla* Benth. in Mart. Fl. Bras. 15^2:248. 1876. (T.: *Spruce 513*!).
Cynometra martiana (Hayne) Macbr. in Contr. Gray Herb. 59:19. 1919.

BRITISH GUIANA: without specific locality, *Schomburgk 197 (168)* (W).

VENEZUELA: BOLÍVAR: Laguna de los Chivos (Municipio Upata), *Delgado 216* (G, US); *Pittier 216* (G); AMAZONAS: Cano Macasi, Capihuara, Alto Casiquiare, *Llewelyn Williams 15593* (US, V).

COLOMBIA: Río Apaporis between Río Pacoa and Río Kananari, *Schultes & Cabrera 12616* (US).

BRAZIL: AMAZONAS: Barra, Rio Negro, *Spruce 1513* (K, W); San Carlos, Rio Negro, *Spruce 3479* (NY, P, V, W). MARANHAO: Pedreiras, *Ducke 2320* (G, US); Manaús, *Schwacke 358* (US); Igarapé de Cachoeira Grande, *Ule 8864* (G, NY, U, US), *Ducke 719* (MO, US), *Ducke 24248* (U, US); Igarapé de Marapata, *Ducke 24247* (U). PARÁ: without specific locality, *Spruce s. n.* (NY, P, W); Lago de Faro, *Ducke 8412* (G, US); Esposente municipio Almeirim, *Ducke 3549* (G); Santarem, Alter do Chao, *Ducke 10820*; Bas Xingú, Victoria, *Snethlage 10408* (G); Santarem, *Spruce 872* (K, P); Belém, S. forest of I.A.M., *Archer 7906* (F, K), *7943* (F), *8087* (US); Conceicas perto da Fóz do Rio Juruena, *Pires 3912* (NY); Cachoeira do Rio Arua, *Pires & Silva 4210* (NY); Rio Tucuruhy near Rio Xingú, *Kuhlmann 17655* (G, P, U, US).

PERU: LORETO: Mishuyaca, Iquitos, *Klug 1448* (F, NY, US); Marañón, Iquitos, *Tessmann 3636* (F, G).

In 1919 Macbride effected the combination *Cynometra martiana* (Hayne) Macbr. maintaining that Baillon's earlier combination *Cynometra martiana* (Hayne) Baillon is untenable inasmuch as "it is a valid species of *Hymenaea* (*H. martiana* Hayne)." According to Macbride, Hayne's specific name *martiana* may be used for the "species of *Cynometra* which has heretofore borne the later published name of *C. spruceana.*" No doubt he bases this on the fact that the plate in Hayne's Arzneigew (11: *pl. 17.* 1839), labeled *Trachylobium martianum* is a *Cynometra.*

However, the binomial C. *martiana* (Hayne) Macbr. is illegitimate, being a homonym of C. *martiana* (Hayne) Baillon which is applied to a valid species of *Hymenaea*. That this name has not been applied in the past to a *Cynometra* but to a species of *Hymenaea* makes no difference, the binomial C. *martiana* being already published.

After examination of type collections of Bentham's two varieties, β *procera* and γ *macrophylla*, I am unable to find any strong characters to substantiate giving them varietal status. Examination of the type material of var. *procera* deposited in Vienna shows leaflets of obviously different ages; the more mature leaflets are thicker with the secondary veins immersed above, and the venules inconspicuous beneath, while the more juvenile leaflets are obviously more reticulate beneath with the secondary veins prominulous above. Since Bentham distinguishes var. *procera* by "foliolis quam in forma typica minus coriaceis," it seems unwise to recognize this variety without additional supporting collections. As for var. *macrophylla*, the type collection deposited in Vienna has leaflets which are less elongate than those described by Bentham ("3–4 pollicaribus"); another character used by Bentham, the length of the racemes and the pedicels, is so variable in the typical material that it cannot be regarded as a strong one.

While the pedicels and rachises of the racemes are constantly filiform, there is considerable variation in their length; *Tessmann 3636*, for example, has elongate rachises but relatively short-pedicelled flowers; *Ule 8864* has both elongate rachises and elongate pedicels; *Pittier 216* has both short rachises and short pedicels.

Two excellent plates of C. *spruceana* are available, one in Hayne's Arzneigew 11: *pl. 17*. 1830, and the other in Martius Flora Brasiliensis 15^2:247. *pl. 65*. 1876.

14b. CYNOMETRA SPRUCEANA var. **phaselocarpa** (Hayne) Dwyer, comb. nov.

Vouapa phaselocarpa Hayne, in Flora 10(11):745. 1827.
Cynometra racemosa Benth. in Hook Lond. Jour. Bot. 100. 1840. (T.: *Spruce s. n.*!)
Cynometra obtusa Benth. in Pl. Spruce exs. Nomen.
Cynometra phaselocarpa (Hayne) Macbr. in Contr. Gray Herb. 59:19. 1919.

BRAZIL: AMAZONAS: Barra, *Spruce 1428* (K); Barra, Rio Negro, *Spruce s. n.* (F, NY, P, U, W); Santa Izabel, *Ducke 509* (A, NY, MO, US), *35415* (G, P, U, US); Manaus, Rio Tarumá, *Ducke 676* (F, MO, US), *Ducke 1010* (MO, US).

The obtuseness of the apex of the leaflets does not seem to be sufficient grounds to warrant the retention of C. *phaselocarpa* as a distinct species. In all other respects it bears a striking resemblance to C. *spruceana* var. *spruceana*, especially in the character of the lax racemes with elongate rachises and filiform pedicels. Ducke's collection *676* is important inasmuch as it bears legumes. The common name of the variety is "jutahy-rana" (fide Ducke).

15. CYNOMETRA LONGICUSPIS Ducke, in Bol. Técn. do Instit. do Norte. 2:11. 1944. (T.: *Ducke 1593*!).

Medium-sized trees. Branchlets terete, ultimately angular and arcuate, smooth, glabrous, drying purple to ashen-white. Petioles up to 8 mm. long, about 1.5 mm.

wide, slender, glabrous to scattered-puberulent; petiolules 0.5–1 mm. long. Leaflets oblong, up to 8 cm. long, up to 3 cm. wide, the acumen up to 1 cm. long, about 2.5 mm. wide in middle, ultimately emarginate, the sinus about 0.5 mm. deep, obtuse at base on wider side, the costa prominulous above and below, the secondary veins ± 10, immersed or plane, not markedly arcuate-ascending, the ultimate reticulations evanescent, the lamina coriaceous, lustrous above and below, rugulose above and below (sub mag.), inequilateral, glabrous (except possibly on costa); inflorescences, bracts, bracteoles and complete flowers not seen. Sepals (one seen) suboblong, 4 mm. long, about 1.3 mm. wide, glabrous; petals not seen; filaments (two seen) linear, about 7 mm. long, the anthers not seen; rachis of fruit woody, 2–5 mm. long, about 1.8 mm. wide, ligneous, glabrous. Pedicels ± 5 mm. long, somewhat smooth, apparently glabrous; legume obliquely oblong to oblong-rotund, up to 8 mm. long, up to 6 mm. wide, plump puberulent, rough and crustulose, the stipe up to 1.5 mm. long.

BRAZIL: AMAZONAS: Tocantins beyond Villa Velha, *Ducke 1593* (F, NY).

Ducke in his brief diagnosis of this species related it to *C. bauhiniaefolia* and to *C. spruceana*. He mentions the "poor fragments of old flowers [which] do not show differences from those of the widely distributed *C. bauhiniaefolia.*" A study of the type material suggests that *C. longicuspis* is probably closely related to *C. spruceana*. The fruits of the latter species are more rugose.

Ducke states (loc. cit.) that it is a rather large tree found in very humid places at Tocantins and São Paulo de Olivença, at São Gabriel and its tributary, Rio Vaupes.

Two collections made by Froes (*22147* and *20723*), labeled *C. longicuspis*, are obviously misidentified. The former collection (in fruit) appears to be a *Peltogyne*.

16. CYNOMETRA LONGIFOLIA Huber, in Bol. Mus. Goeldi 5:384. 1908. (T.: *Ducke 9083*!).

Tree? Branchlets zig-zag, subterete, puberulent; the lenticels conspicuous. Petioles up to 0.7 cm. long, puberulent. Leaflets narrow-oblong, 7–12 cm. long, 2.5–2.8 cm. wide, tapering into an obvious acumen (up to 1 cm. long), subauriculate at base on wider side, the costa prominulous above, glabrous (except hairs occasionally scattered on under surface), lowermost pair of secondary veins usually arising sharply from one point at base of costa, the others well-spaced along length, prominulous to evanescent above, prominulous below, the lamina rugulose (under mag.), coriaceous, inequilateral, glabrous (except costa beneath). Bracts ovate, up to 5 mm. long, occasionally wider than long, often persistent, pubescent dorsally, the marginal hairs often tufted; bracteoles oblong, up to 6 mm. long, about 1 mm. wide, located near middle of pedicel, the hairs ferrugineous, more dense along median axis, tufted apically, the pedicels slender, about 1 cm. long, about 0.5 mm. wide. Racemes apparently solitary in the axils, the rachises up to 6 cm. long, up to 2 mm. wide, ferrugineo-villose, 30- to 50-flowered; sepals 4, widely to narrowly oblong, 3–4 mm. long, 2–3 mm. wide, puberulent on outside especially below middle; petals lanceolate, 4–4.8 mm. long, 1.3–1.4 mm. wide, acuminate; filaments up to 8 mm. long, the anthers about 1 mm. long; ovaries (here in young fruit) about 4 mm. long, about 2.7 mm. wide, pilose. Fruit oblong, up to 2 cm. long, up to 1.4 cm. wide, obviously rugulose.

BRAZIL: PARÁ: Santarem, *Spruce s. n.* (W); Rio Mapuera, Maloquinha, *Ducke 9083* (G).

C. longifolia is obviously related to *C. spruceana* as evidenced by its narrowly oblong leaflets rugulose above, elongate rachises of the racemes, filiform pedicels, and bracteoles attached near the middle of the pedicels. It is readily distinguished by its large leaflets, persistent bracts, unusually elongate rachises, and multi-flowered racemes.

Huber originally described the ovary as sparsely villose; my dissections indicate that it is densely villose.

17. CYNOMETRA **duckei** Dwyer, sp. nov. (T.: *Ducke 7165b* (G)!).

Arbores. Ramuli ultime puberuli cortice in siccitate cinereo. Petioli ad 0.2 cm. longi, glabri vel puberuli. Foliola sessilia oblique oblongo-rotunda vel semi-ovata, 0.7–2.5 cm. longa, 0.5–1.5 cm. lata, apice obtusa emarginata, basi latiore latere obtuso, costa supra prominula gradatim ad apicem evanescente infra plana, venis secundariis ± 10 supra inconspicuis lamina nullo modo reticulata vel papillosa (sub mag.) inaequilaterale latiore latere duplo triploque plure, margine evidenter calloso; bracteae, bracteolae, rhachides, flores non visa; pedicelli (hic fructuum) ad 1.5 cm. longi, pubescentes graciles. Legumina, subrotunda, 1.2 cm. longa, 1 cm. lata, turgida evidenter tuberculata vel rugosa crustulis parvis deciduisque ornata.

BRAZIL: AMAZONAS: Rio Negro, *Ducke 7165b* (G, US).

After considerable deliberation I have decided to describe this as a new species. Ducke labeled the material *C. parvifolia*. Its foliage bears a closer resemblance to that of *C. spruceana*, among the Amazonian species and, oddly enough, to *C. cubensis*. The leaflets are obviously much smaller and completely different in shape (due in part to the marked inequilateral condition) than those of *C. spruceana*. The most striking feature of the new species is the smoothness of the leaflets on the upper surface, with no evidence of these being reticulate or papillate; the secondary veins are scarcely visible and the costa tapers above the middle, disappearing toward the apex of the lamina. Only one legume was seen.

18. CYNOMETRA BAUHINIAEFOLIA Benth. in Hook. Lond. Jour. Bot. 2:99. 1840.

Shrub or tree. Branchlets smooth, glabrous to minutely puberulent, the lenticels conspicuous. Petioles 0.2–0.6 cm. long, glabrous to densely pilose. Leaflets obliquely ovate-oblong to ovate-lanceolate, 1–4 cm. long, 0.5–2 cm. wide, the costa prominulous above, the secondary veins 7–8, of these 2–3 obviously spreading flabellately from base of costa on wide side and scarcely distinguishable from costa basally, the lamina reticulate, vaguely papillate to scarcely papillate below, thin-coriaceous, obviously inequilateral, glabrous to minutely puberulent. Bracts oblong to ovate, 1–2.3 mm. long; bracteoles oblong, up to 2 mm. long, carinate, densely pilose. Racemes compressed in axils, the rachises apparently usually several per axil, 1–4 mm. long, pubescent, usually 4- to 9-flowered; pedicels up to 7 mm. long, puberulent; sepals 3–4, widely oblong, ovate-oblong or obovate-oblong, 2.5–3 mm. long, 1–3.5 mm. wide; petals ovate to obovate-oblong, 2–3.6 mm. long, obtuse to acuminate at apex, obtuse to cuneate at base; filaments of stamens 4–9 mm. long, the anthers 0.5–0.7 mm. long; ovaries oblong to oblong-rotund, 2–3.5 mm. long, 1.5–2 mm. wide, completely pubescent, the style up to 5 mm. long. Legume oblong to subrotund, up to 2.5 cm. long, up to 2 cm. wide, rugulose or tuberculate, minutely and densely tomentose, the wall of pericarp up to 2 mm. thick.

KEY TO THE VARIETIES

Shrubs or trees; leaflets obviously reticulate, the margin not curled; flowers white.
  Leaflets 1–4 cm. long, 0.5–2.0 cm. wide, glabrous to minutely puberulent on costa below; petals up to 2.8 mm. long..........18a. *C. bauhiniaefolia* var. *bauhiniaefolia.*
  Leaflets 4–6 cm. long, up to 3 cm. wide, completely puberulent; petals up to 5.5 mm. long. ....18b. *C. bauhiniaefolia* var. *grandiflora.*
Large trees; leaflets lustrous, not conspicuously reticulate, the margin obviously curled; flowers yellow..........18c. *C. bauhiniaefolia* var. *meridiana.*

18a. CYNOMETRA BAUHINIAEFOLIA var. BAUHINIAEFOLIA.

GUATEMALA: ALTA VERAPAZ: Río Icvolay between Río Apia and Río Soctela, *Steyermark 45034* (F).

SURINAM: without specific locality, *Schweintz s. n.* (NY); Commewijne, *B. W. 1137* (U); Surinam River, *Mell 17* (US).

BRITISH GUIANA: without specific locality, *Richard Schomburgk s. n.* (G, W); Pirara, *Schomburgk 241* (W); Berbice, *Schomburgk 230* or *231* (F, G, K, NY, W); Rio Essequibo, *Herb. N. Y. Bot Gard. Field no. G 126, Record 6217* (NY); Essequibo River, *British Guiana Forest Service 6217* (G, NY, U), *6126* (G); banks of Cerenlyne Epiro, *Im Thurn s. n.* (K); Takutu River, S. Lethem, Rupununi District, *Irwin 814* (US).

VENEZUELA: without specific location, *Maguire & Maguire 4047* (K); BOLÍVAR: La Pargua, *Killip 37611* (G, NY, US, V). AMAZONAS: El Bagre, Pto. Ayacucho, *Llewelyn Williams 1307* (US).

COLOMBIA: Río Guaviare, San José del Guaviare, *Cuatrecasas 7754* (US).

BRAZIL: without specific locality, *Newman s. n.* (G); *Burchell 8830* (K); *Burchell 9951* (NY, P); AMAZONAS: Jaru, Rio Branco, *Kuhlmann 2919* (U, US, P); Rio Branco, S. Bento, *Ule 7776* (G, K, US); Rio Branco, Faz. S. Bento, *Black 51-13287* (US); Rio Sinho, Juruema, Rio Jutuhy, *Froes 21043* (F, K, NY, US); Bõa Vista, Rio Branco, *Ducke 1355* (K, NY, (only part of sheet), US); Tefé, *Pires 1327* (NY). PARÁ: Tapajoz, Bõa Vista, *Capucho 529* (F); Faz. Tuiuiu, Rio Arari, *Black, Ledaux & Stegemann 52-14-284* (US). RIO DE JANEIRO: Quinta de São Christovao, *Glaziou 18426* (P).

PERU: SAN MARTÍN: Ucayli, *Tessmann 3444* (G, NY). LORETO: Río Haya, *Llewelyn Williams 40* (F); Pro, Amazon River, *Llewelyn Williams 1984* (A, F, US); Río Mazan near Iquitos, *Llewelyn Williams 8142* (F).

ARGENTINA: CORRIENTES: Mercedes, *Rodrigo 782* (NY).

CHILE: without specific locality, *McJohn Style s. n.* (G).

C. bauhiniaefolia with the most extensive geographical range among the New World cynometras is readily recognized by the arrangement of the secondary veins of the leaflets inasmuch as the lowermost 2 or 3 (on the wider side) arise flabellately from the proximal part of the costa. These are as prominent near their point of origin as the adjacent costa. A striking feature is the thick-walled fruit which is densely tomentose.

18b. CYNOMETRA BAUHINIAEFOLIA var. **grandiflora** Dwyer, var. nov. (T.: *Ducke 16896* (U)!)

Foliola ad 6 cm. longa, omnino puberula; petala ad 5.5 mm. longa.

BRAZIL: PARÁ: Botanical Garden, Belem do Pará, *Ducke 16896* (P, U, US).

The new variety is readily distinguished by its unusually large leaflets which are entirely puberulent. The flowers are strikingly large.

18c. CYNOMETRA BAUHINIAEFOLIA var. **meridiana** Dwyer, Var. nov. (T.: *Jorgensen 2124* (MO)!)

Foliola laevia nitida venis secundariis evanescentibus marginibus conspicue crispis; flores lutei.

ARGENTINA: Formosa, *Jorgensen 2124* (MO, U); Formosa, Río Coltapick, Colonia Herradura, Boca del Bermejo, *Pedersen 1295* (US).

19. CYNOMETRA MICROFLORA Cowan, in Mem. N. Y. Bot. Garden 8(2):114–115. 1953. (T.: *Maguire & Maguire 29010*!)

Small trees; branchlets glabrous to puberulent; petioles up to 3 mm. long; leaflets ovate-rotund or oval-lanceolate, up to 2 cm. long, up to 1.5 cm. wide, conspicuously obtuse above, more rounded (on wider side) basally, the secondary veins 3–4, prominulous, somewhat evanescent above, the lowermost pair arising flabellately from base of costa and resembling the latter, thin-coriaceous, glabrous, smooth, obviously inequilateral; racemes compressed, the rachises scarcely measurable, few-flowered; pedicels filiform, glabrous, up to 5 mm. long; sepals oblong, up to 2 mm. long, 1 mm. wide; petals lanceolate, 2–2.5 mm. long, up to 0.8 mm. wide; filaments up to 2 mm. long, the anthers up to 0.5 mm. long; ovary oval, up to 1.5 mm. long, densely puberulent, the style up to 2 mm. long; legumes oblong-lanceolate up to 1 cm. long, up to 0.6 cm. wide, somewhat rugulose, densely puberulent.

VENEZUELA: La Urbana, Orinoco River, *Maguire & Maguire 29010* (NY, V).

This species is very closely related to *C. bauhiniaefolia* and may well be interpreted in the future as a variety of the same. Its small leaflets and flowers, as well as its glabrous pedicels distinguish it from its ally.

20. CYNOMETRA PARVIFOLIA Tul. in Arch. Mus. Paris. 4:181. 1844. (T.: *Hostmann 204*!).

Small or medium-sized tree. Branchlets smooth, densely puberulent. Petioles about 0.1 cm. long, densely pilose. Leaflets narrow-lanceolate, 1–1.8 cm. long, 0.2–1 cm. wide, the costa prominulous above, the secondary veins ± 7, the lowermost spreading flabellately from base of costa, prominulous but inconspicuous above, the lamina reticulate, rugulose (under mag.), thin-coriaceous or coriaceous, inequilateral, glabrous. Bracts compressed-rotund to ovate-oblong, up to 2 mm. long; bracteoles located at base of pedicels, oblong, up to 1 mm. long, carinate, the hairs few, deciduous; racemes compressed, axillary, the rachises up to 5 mm. long, densely pilose, the flowers 4–6 per raceme; pedicels 0.4–1 cm. long, ferrugineo-villose. Sepals 4–5, ovate-oblong, oblong-rotund or subrotund, 3–4.6 mm. long, 1–2.6 mm. wide, glabrous or puberulent dorsally and marginally; petals oblong to obovate-oblong, 3.5–4.6 mm. long, 0.8–1.8 mm. wide, glabrous, or often with several weak hairs at apex, obtuse or clawed at base; filaments 4–10 mm. long, the anthers oblong, 0.4–1 mm. long; ovaries oblique-oblong, 1.3–2.5 mm. long, 1–2.5 mm. wide, densely pilose, the style ± 4 mm. long. Legume rotund, coccoid, up to 0.9 cm. long, 0.9 cm. wide, plump, the surface minutely crustulose, the wall of pericarp about 1 mm. thick.

SURINAM: without locality, *Hostmann 204* (NY); Marowyne and Gonine Rivers, *Gonggryp 3751* (U); Surinam River, *Kappler 1905* (U); Marowyne River, *Lanjouw & Lindemann 3471* (U).

BRAZIL: AMAZONAS: Caracarahi, Rio Branco, *Ducke 23788* (G, P, U, US); Bōa Vista, Rio Branco, *Ducke 1355* (NY, in part only).

C. *parvifolia* is readily distinguished by its very small leaflets (not exceeding 2 cm. in length) which are narrow-lanceolate. It appears to be closely related to *C. marginata* and to *C. bauhiniaefolia.*

21. CYNOMETRA HOSTMANNIANA Tul. in Arch. Mus. Paris 4:180. 1844. (T.: *Hostmann 169*!).

Medium-sized tree. Branchlets wiry, smooth, glabrous, the lenticels often inconspicuous. Petioles about 0.5 cm. long, glabrous to pubescent. Leaflets equilateral to subequilateral, ovate-lanceolate, oblong-lanceolate, 6–12.5 cm. long, 2.5–8 cm. wide, tapering sharply toward apex, usually short-acuminate, the wide side cuneate or sub-rotund at base, the costa prominulous above, the secondary veins ± 20, strict or scarcely arcuate, the lamina obviously reticulate, non-rugulose (under mag.), thick-chartaceous to coriaceous, subequilateral, glabrous. Bracts ovate-rotund to rotund, 1–1.3 mm. long, 1–1.4 mm. wide, puberulent dorsally and marginally; bracteoles absent. Racemes often umbelloid in shape, 1–4 per axil, the rachises up to 7 mm. long, puberulent, the pedicels slender, up to 1.5 cm. long, glabrous or sparingly pubescent. Sepals ovate-oblong to oblong, 2.8–4 mm. long, 1.1–1.9 mm. wide, glabrous or puberulent dorsally, puberulent at apex. Petals narrow-oblong, up to 4.5 mm. long, 0.4–1.5 mm. wide, acuminate at apex, obtuse at base; filaments up to 4 mm. long, the anthers oblong to oblong-rotund, 0.5–0.7 mm. long; ovaries oblong to oblong-rotund, about 2 mm. long, densely pubescent, the style up to 3.8 (5?) mm. long. Legumes oblong, up to 4.5 cm. long, up to 3.5 cm. wide, the surface obviously rugulose, the rugae minutely granulose, the wall of the pericarp up to 0.5 cm. thick, the sterile pods deeply wrinkled and without any locule.

FRENCH GUIANA: without specific locality, *Melinon s. n.* (A, F, NY, P, US); *Vaillant 101* (P).

Surinam: without specific locality, *Haller s. n.* (U); *Wüllschlaegel 1438* (B), *1656* (B); *B. W. 198* (U); *B. W. 198a* (U), *B. W. 476* (U), *B. W. 3878* (U); *Lanjouw & Lanjouw 1891* (U); *Gonggryp 457* (U); *Lindeman 308* (U); Watamiri River, *B. W. 1508* (US); Watamiri, *B. W. 1958* (U), *3861* (U); Maroni, *Sagot s. n.* (W); *Sagot 1093* (U); Saramacca, *Stahel 198a* (NY, U, Y); Marowyne near Poeloegoedoe, *Versteeg 552* (U), *576* (U); Marowyne River, *Gonggryp 5357* (U); Coppename River, *B. W. 155* (U); Coppename, *Gonggryp 2568* (MO, U); banks of Surinam River, *Mell s. n.* (NY, US); Paramaribo, *Hostmann 169* (F, NY, W).

British Guiana: Brandtwegt, Berbice River, *British Guiana Forest Dept. 6365* (U); without specific locality *Jenmann 1859* (NY, U).

Brazil: amazonas: Amapa, Rio Oiapoque, *Froes 25771* (US); pará: Trombetas (Cachoeira Porteira e Rio Cuminá-mirim), *Ducke 10911* (R).

A number of substantial characters serve to distinguish this species: the consistently equilateral leaflets, the minute bracts, the absence of bracteoles, and the often glabrous pedicels.

It is difficult to relate this species to the other New World cynometras. Its usually umbelliform racemes are suggestive of those of *C. trinitensis* and *C. retusa.*

A fragment of a leaflet from *Lanjouw & Lanjouw 1891* (U) was found to measure 8 cm. in width, indicating that the intact leaflets reach up to 20 cm. or more in length, thus presumably possessing the largest leaflets among the New World cynometras.

Despite the numerous collections of *C. hostmanniana* very few were found in fruit; the legumes when semeniferous, are deeply wrinkled on the surface and are thin-walled (the pericarp up to 0.5 mm. thick), a noteworthy fact considering that the valves are probably the largest (up to 4.5 cm.) among the New World species. The sterile fruits are very thick walled (cf. remarks in introduction, p. 317). Amshoff (Fl. Surinam) makes the interesting comment that the "infertile pods . . . at last splitting into 2, showing no cavity."

Common names assigned to the species include "Sakabali" (British Guiana), "Sahkaballi" (Surinam), "Malako" (Surinam), and "Makraka" (Surinam).

22. Cynometra fissicuspis (Pittier) Pittier, Arbol y Arbust. Venez. Legum. 1:132. 1928.

Copaifera fissicuspis Pittier, Arbol y Arbust. Venez. Dec. 2–3:25. 1923. (T.: *Pittier 10933*!)

Guibourtia fissicuspis (Pittier) Léonard, in Bull. Jard. Bot. de l'Etat Bruxelles 19 4:402. 1949.

Trees 25–30 m. high. Trunk erect with elongated crown. Twigs smooth and glabrous below, conspicuously lenticellate, the tips angular, puberulent. Petioles 0.5–2 mm. long, 0.1 cm. wide. Leaflets sessile, ovate to ovate elliptic, 2–4.5 cm. long, 0.8–2 cm. wide, the narrow side of lamina 0.4–0.8 cm. wide, the wide side 0.5–1.1 cm. wide, obtuse and emarginate, the sinus about 0.5 mm. deep, often apiculate at base of sinus, the narrow side of lamina attenuate toward base, the wide side of lamina auriculate at base, the costa prominulous above and below, the principal secondary veins 10–20, slender, prominulous, the lamina drying light green to light brown, subcoriaceous, glabrous, subequilateral to obviously inequi-

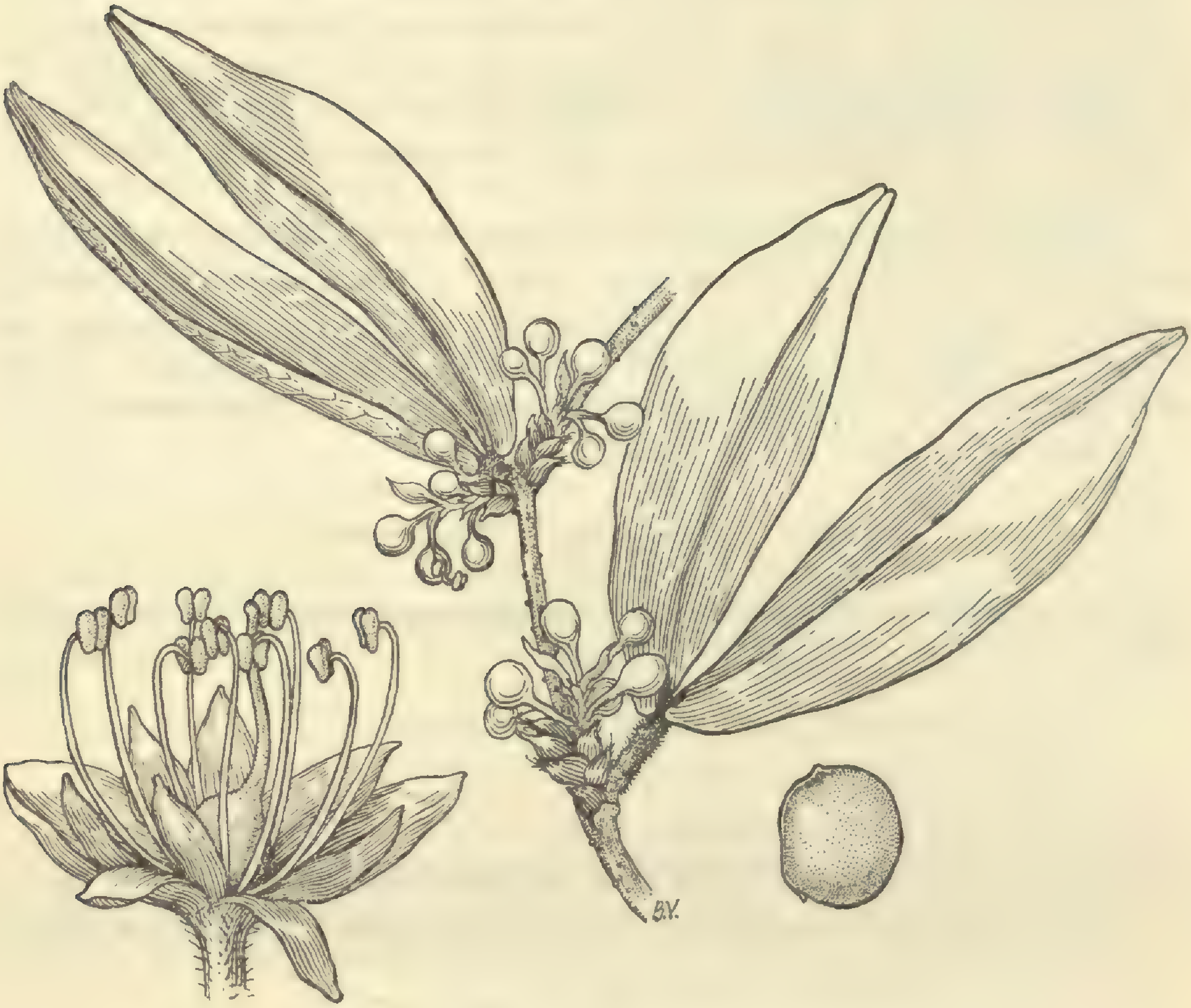

Fig. 1. *Cynometra fissicuspis*
Flower ×7; flowering twig ×2; fruit ×2.

lateral, reticulate. Racemes 1–2 per axil, the rachises up to 2 mm. long, the flowers ± 6 per rachis. Pedicels up to 6 mm. long, about 0.3 mm. wide, puberulent. Bracts up to 2 mm. long, concave, glabrous. Bracteoles narrowly oblong, up to 2 mm. long, about 0.5 mm. wide, vaguely carinate, sparsely hairy above middle to glabrous. Sepals 4–5, oblong, up to 3 mm. long, up to 2 mm. wide, glabrous, thin. Petals lanceolate, up to 3 mm. long, 0.5–1.1 mm. wide, acute or subobtuse at apex, glabrous; filaments up to 6 mm. long, about 0.15 mm. wide, the anthers up to 0.7 mm. long; ovary rotund, up to 2 mm. long, glabrous, the style up to 3 mm. long, the stigma capitate, the ovules solitary. Legumes obliquely orbicular, 1–2 cm. in diameter, falcately apiculate, indehiscent, the valves reticulate, and papillate or rugulose (sub mag.), a slender keel (up to 0.5 mm. wide) on dorsal side, the wall of pericarp about 0.5 mm. thick, the seeds solitary, filling the locule.

VENEZUELA: ZULIA: Río Lora, Santa Ana, *Pittier 10933* (GH, NY, US).
COLOMBIA: Río Zulia, *Nicéforo s. n.* (US); MADGALENA: Cucharo, *Castañeda 641* (MO).

This is the only species among the New World cynometras which has had a complicated taxonomic history. This is due to the fact that the type collections distributed to herbaria are all sterile and secondly due to Pittier's description of the leaflets as pellucid-punctate. The leaflets are not so characterized although some show (under magnification) areas which have become thinner, probably due to drying.

The flowering and fruiting material of *Nicéforo s. n.* provided a solution to the difficulty. The flowers are obviously those of a *Cynometra.* Their glabrous condition is unique for the New World species. Perhaps more noteworthy are the coin-like (thus section Nummus) legumes, smooth and reticulate on the surface, and the leaflets auriculate on the wide side at the base. The common name of *C. fissicuspis* is "Aracito" (fide Pittier).

SPECIES TRANSFERRED OR EXCLUDED

I am transferring two species of *Cynometra*, apparently known only from Minas Geraës, Brazil, to the genus *Peltogyne.*

PELTOGYNE **glazovii** (Taub.) Dwyer, comb. nov.

Cynometra Glazovii Taub. Flora 75:76. 1892.

Type Locality: Minas Geraës, Brazil.

Distribution: Known only from the State of Minas Geraës, Brazil.

BRAZIL: MINAS GERAÊS: sans locality, *Glaziou 13725*; *Glaziou 14617* (NY, P, US).

PELTOGYNE **riedeliana** (Harms) Dwyer, comb. nov.

Cynometra riedeliana Harms, Fedde Report 24. 209. 1928.

Type Locality: Minas Geraës, Brazil.

Distribution: Known only from Brazil.

BRAZIL: without locality, *Dorsett, Shamel & Popenoe 136b* (U); MINAS GERAÊS: Serro do Corcovado, *Riedel & Luschnath 1182* (A, US); locality and State not decipherable, *Riedel 601* (?) (F, photo. and frag. of syntype collection of *C. riedeliana* ?).

Two important characters make it clear that the two species are referable to *Peltogyne*: the paniculate inflorescence and the glandular-punctate nature of the sepals and leaflets. The flowers of all of the cynometras, including the many species of the Old World, are in racemes and have non-glandular sepals. Another character of importance is the pubescence of the sepals on the inner surface; in all of the New World cynometras the sepals are glabrous within, except rarely at the very base. Unfortunately the fruits of *Peltogyne riedeliana* and *P. glazovii* are unknown.

Ducke in a recent paper (1949) has contributed valuable data on the Amazonian species of *Peltogyne*. From a study of his paper, as well as from a study of specimens it appears that *P. glazovii* and *P. riedeliana* belong to the *P. pauciflora*, *P. floribunda*, and *P. discolor* complex, segregated by Ducke in his key (loc. cit.).

I have excluded the following species from the main body of the paper for reasons discussed below.

1. CYNOMETRA ZAMORANA R. E. Schultes, Bot. Mus. Leaflet Harvard 13(10): 301–302. 1949.

C. zamorana is referable to the genus *Hymenaea*; the type of *C. zamorana* is *Schultes 5429* (GH) from Comisaria del Vaupes, Río Macaya, Cachivera del Diablo, Colombia.

2. CYNOMETRA SPHAEROCARPA Pittier, Enum. de Las Plantas Usuales 184. 1926.

Unfortunately I have not seen the type material (in fruit only) collected at Caruao, Federal District, Venezuela. Pittier not only fails to indicate the type collection but also mentions only a few characters which may be of importance: "las hojas inequilanceadas, largamente atenuadas . . . los frutos son subglobosos, de 3.5–4 cm. de diametro." Pittier states that the common name is "cobalonga", and adds that the wood is excellent for construction and the seeds are "estomáquicas y antipalúdicas".

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Italicized numbers refer to collectors' numbers, *s. n. (sine numero)* to unnumbered collections; parenthetical numerals refer to the numbers assigned to the species in this monograph.

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Richard, L. C. M. *s. n.* (13).
Record, S. *8832* (4).
Rodrigo *782* (18a).
Rovirosa, J. N. *748* (4).

Sagot, P. A. *s. n.* (21), *1093* (21).
Sagra, de la R. *s. n.* (2), *307* (2).
Schipp, N. A. *1192* (7).
Schomburgk, Rich. *s. n.* (9b), *s. n.* (18a), *197 (168)* (14a), *230* or *231* (18a), *241* (18a), *777* (9b), *1533* (9b).
Schomburgk, Robt. (Herb Hance *7667*) *s. n.* (9b).
Schott, A. C. *XII 857* (8).
Schultes, R. & I. Cabrera *12616* (14a).
Schwacke, C. A. W. *358* (14a).
Schweintz *s. n.* (18a).
Sintenis, P. E. E. *5600* (3).
Snethlage, E. H. *10408* (14a).
Spruce, R. *s. n.* (14a), *s. n.* (14b), *872* (14a), *1428* (14b), *1513* (14a), *3479* (14a).
Stahel, G. *198a* (21).
Standley, P. *7873* (4), *24254* (4), *52915* (4), *56686* (4).
Standley, P. & Valerio *48799* (5).
Steyermark, J. *38671* (4), *44557* (4), *45034* (18a), *45565* (4).

Tessmann, G. *3444* (18a), *3636* (14a).
Tresling, J. *300* (9a).
Trinidad Bot. Gard. (6).
Tonduz, A. *9972* (5).

Ule, E. *7776* (18a), *8864* (14a).

Vaillant *101* (21).
Versteeg, G. M. *552* (21), *576* (21).

Williams, Llewelyn *40* (18a), *1984* (18a), *8142* (18a), *13037* (18a), *15593* (14a).
Wright, C. *2386* (2).
Wüllschlaegel, H. R. *1438* (21), *1656* (21).

Yuncker, Koepper, & H. Wagner *8007* (4).